

California High-Speed Train Project



Agreement No.: HSR 13-06
Book 3, Part B, Subpart 1

Verification, Validation and Self-Certification

HSR 13-06 - EXECUTION VERSION

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1 Introduction

This section includes:

- Verification and Validation (V&V) requirements for Contractor to demonstrate compliance with Technical Contract Requirements set forth in this Contract by provision of objective evidence.
- Requirements for Contractor Self-Certification to certify that the Technical Contract Submittals conform to Technical Contract Requirements as detailed in the Contract and as reasonably inferred therefrom.
- Requirements for Independent Verification and Validation (IV&V) performed by an Independent Checking Engineer (ICE) and Independent Site Engineer (ISE).

Technical Contract Requirements are defined as Contract Requirements specifying the characteristics of the final infrastructure deliverable including related final design, construction, inspection, testing, and acceptance requirements. Technical Contract Submittals are defined as the Contract submittals that address the Technical Contract Requirements, including:

- Final design drawings and specifications
- Ready for construction drawings and specifications
- Inspection plans, procedures, and reports
- Test and acceptance plans, procedures, and reports
- As-built drawings and specifications

This section does not include:

- Submittal and review requirements for non-technical submittals, including management related and administrative submittals (e.g. the project management plan, schedules, invoices, status and progress reports, letters, etc.)
- List of individually required Contract Submittals
- Quality control/assurance requirements
- Specific inspection, and testing requirements

Refer to the applicable Contract sections for the requirements not included in this section. Unless otherwise noted, all requirements in this document shall be performed by the Contractor.



1.1 Reference Standards

- International Electrotechnical Commission (IEC)
 - IEC 10007 – Quality management system –Guidelines for configuration management
 - IEC 15288 – Life Cycle Management–System Life Cycle Processes
- Institute of Electrical and Electronics Engineers (IEEE)
 - IEEE 1220/IEC 26702 – Systems engineering–Application and management of the systems engineering process

1.2 Scheduling

- Include V&V submittals listed in Section 3.6 in Contract schedule.
- Add V&V activities as defined in Verification and Validation Plan to Contract schedule.

1.3 V&V Submittals

Add V&V submittals listed in Section 3.6 to the Technical Contract Submittal List (TCSL).

Each Technical Contract Submittal shall be accompanied by a V&V submittal as defined in Section 2.6 and shown in Figure 1, identifying which Contract requirement it satisfies and explaining how the Contract requirement is met, inspected, or tested by the Contractor's final design and construction. V&V submittals include the Requirements Verification Traceability Matrix (RVTM), Certifiable Items List (CIL), and a V&V report explaining how the Technical Contract Submittals meet the Technical Contract Requirements.

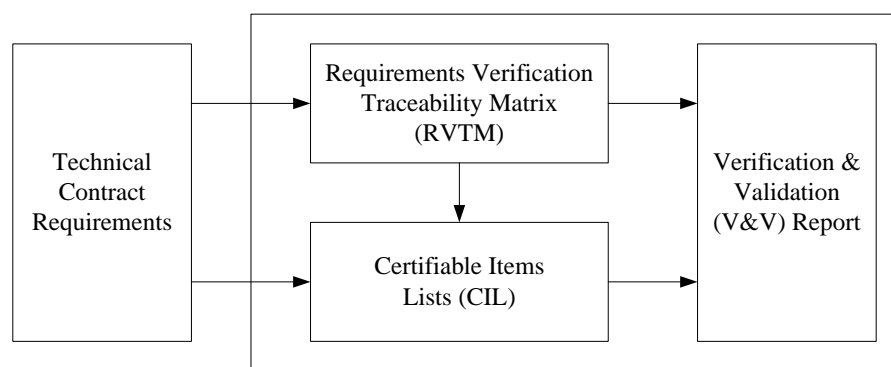


Figure 1: Contractor V&V Submittal

1.4 Self Certification Process Overview

Follow the Self-Certification Process as defined in Section 3.1.



1.5 Terms and Acronyms

Term	Definition
Authority	California High-Speed Rail Authority
Authority's Representative	PM/CM, PMT or Authority
Certifiable Item	Contract Requirement that requires independent verification.
CIL	Certifiable Items List
Contract Requirement	Any part of the Contract that requires an action or deliverable to be performed by the Contractor.
Contract Submittals	Submittals other than V&V submittals as required in this Contract
EIR/S	Environmental Impact Report/Statement
Fitness for Purpose	A product is suitable for the intended purpose
HSR	High Speed Rail
IBS	Interface Breakdown Structure
ICE	Independent Checking Engineer
IM	Interface Management
ISE	Independent Site Engineer
PM/CM	Project Management / Construction Management
PHA	Preliminary Hazard Analysis
PMT	Program Management Team
RM	Requirements Management
RVTM	Requirements Verification Traceability Matrix
ROD	Record of Decision
SONO	Statement of No Objection
Subject to SONO	Submittal subject to a review by the Authority's Representative
Technical Contract Requirement	Contract Requirements specifying the characteristics of the final infrastructure deliverable including related final design, construction, inspection, testing, and acceptance requirements.
Technical Contract Submittal	Contract submittals that address the Technical Contract Requirements
TCSL	Technical Contract Submittal List
TVA	Threat and Vulnerability Assessment
V&V	Verification and Validation
Validation	Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled
Verification	Confirmation by examination and provision of objective evidence that the specified requirements have been fulfilled
VVP	Verification and Validation Plan

2 Products

2.1 Verification and Validation Plan

Develop and implement a Contractor Verification and Validation Plan (VVP) for the project that addresses the sub-processes in the following sections.

The Contractor may choose to submit the V&V plan in individual management plans. Each management plan shall address as a minimum for each process:



- Contract life cycle phases (notice to proceed, final design, construction, and testing/acceptance)
- Deliverables for each phase
- Activities for each deliverable
- Responsibility assignment matrix for deliverables and activities
- Tools and methods used
- Inputs used for each phase
- Stakeholder coordination
- Metrics used to measure and report progress

Submit the VVP as specified in Section 3.6.

2.1.1 Verification and Validation Process

Develop and implement a comprehensive verification and validation process to demonstrate how each Technical Contract Requirement is met during final design, construction, and testing.

Base the V&V process on the general provisions of IEEE 1220/IEC 26702 “Systems engineering–Application and management of the systems engineering process” and follow the general provisions of IEC 15288 “Life Cycle Management–System Life Cycle Processes.”

Tailor the V&V process for the purpose of a civil/structural project.

The V&V lead shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.1.2 Requirements Management

Develop and implement a comprehensive requirements management (RM) process, defining how the Technical Contract Requirements are parsed, captured, documented, derived, apportioned, traced, managed, verified, and validated.

Manage the Technical Contract Requirements Types, including the following:

- Operational requirements
- Safety requirements
- Security requirements
- Environmental requirements
- Reliability, availability, maintainability requirements
- Functional requirements
- Performance requirements



- Physical requirements
- Interface requirements
- Expandability requirements
- Logistics, support, other requirements

The RM lead shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

Manage Technical Contract Requirements in the RM tool as specified in Section 2.2.

Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 2.3.

Certify compliance to critical requirements using the CIL as specified in Section 2.4.

2.1.3 Design Management

Develop and implement a comprehensive design management process, defining how the Technical Contract Requirements are developed into the final design.

Apply the design management process to infrastructure engineering disciplines and associated design elements, including the following:

- General design criteria and requirements
- Survey and mapping
- Clearances
- Track geometry
- Trackwork
- Intrusion protection
- Civil site design
- Drainage
- Utilities
- Geotechnical design
- Seismic design
- Structural design
- Tunnels
- Stations
- Support facilities



- Mechanical, electrical and plumbing
- Grounding and bonding
- Corrosion control

Develop a design breakdown structure, including the following:

- Engineering disciplines within Contract
- Design elements for each engineering discipline

Use RM process to apportion requirements to design breakdown structure. Demonstrate in final design documents compliance with apportioned requirements.

The design management lead shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

Manage the final design documents in the RM tool.

Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 2.3.

Certify compliance to critical requirements using the CIL as specified in Section 2.4.

2.1.4 Interface Management

This contract is part of the overall California High-Speed Train Project (the Project). Many external interfaces and dependencies exist between this contract and other Project contracts and stakeholders.

Develop and implement a comprehensive interface management (IM) process, defining how interfaces are identified, documented, specified, verified, and validated.

Create an interface register with the contents in an interface breakdown structure (IBS), including the following:

- Level 1: Future Project contracts interfacing with this Contract
- Level 2: Sub-systems of future Project contracts
- Level 3: Interfaces categories (e.g. loads, forces, clearances, spatial needs, etc.)
- Level 4: Actual interfaces

Follow the general outline of the interoperability items list as provided in Appendix A – Interoperability Items, and address as a minimum:

- General / system-wide



- Environmental, including noise & vibration, reliability, availability, maintainability, etc.
- Operations & maintenance
 - Operations, maintenance, safety, security
- Rolling stock
 - HST trainsets
- Systems
 - Traction power, overhead contact system, automatic train control system, etc.
- Guideway (infrastructure), excluding trackwork
 - Engineering disciplines as defined in Section 2.1.3
- Trackwork
- Stations
- Storage and maintenance facilities (yards)
- External / third parties
 - Shared rail corridor, shared-use track, high/roadways, utilities, etc.

Manage the interfaces top-down, e.g. HST trainset axle loads shall be treated as a rolling stock interface being imposed on this Contract. Place the interface in the IBS in the future rolling stock category, see interface ID 1073 in Appendix A – Interoperability Items for more detail. The IM lead shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

Manage the interfaces and the interface register in the RM tool.

Demonstrate compliance to Technical Contract Requirements and identified interfaces using the RVTM as specified in Section 2.3.

Certify compliance to critical interfaces using the CIL as specified in Section 2.4.

2.1.5 Inspection and Testing Program Management

Develop and implement a comprehensive inspection and testing program, defining how Technical Contract Requirements are validated.

Develop individual inspection and test management plans, including the following:

- Prototype Testing
 - Use only products that have been proven in comparable high-speed-rail projects.



- If new products are proposed, prototypes shall be built and type-tested prior to First Article Production.
- Retain the services of an independent test lab demonstrating and certifying compliance to the Technical System Requirements and Final Design.
- First Article Compliance Inspection
- Production Run Testing (i.e., at supplier facility during manufacturing)
- Factory Acceptance
- Inspections
- Site Installation
- Site Acceptance
- Integration Testing
- Interoperability Test
- Start-Up Testing
- Pre-Revenue Testing
- Reliability, Availability, Maintainability Testing
- Safety Certification
- Security Certification

For each inspection and test, address as a minimum the following:

- Inspection and test preparation
- Inspection and test coverage
- Inspection and test execution
- Inspection and test reports
- Inspection and test failure reporting, analysis and corrective action system
- Regression inspection and testing

The lead for inspection and test program management shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

Manage the inspections, testing, and acceptance in the RM tool.

Demonstrate compliance to Technical Contract Requirements and final design using the RVTM as specified in Section 2.3.

Certify compliance to critical requirements and interfaces using the CIL as specified in Section 2.4.



2.1.6 Change Management

Refer to Book 2, Part B for overall Contract Change Management.

Develop and implement a comprehensive change management process, defining how changes to the Technical Contract Requirements Baseline are managed.

Follow the general provisions of the latest version ISO/IEC 10007 “Quality management systems–Guidelines for configuration management” and as stipulated by the standards listed in this section.

Address as a minimum the following:

- Configuration identification, including Technical Contract Requirements, final design, construction, and testing/acceptance baselines
- Configuration control, including impact analysis and approval procedures including Configuration Control Boards
- Configuration status accounting
- Configuration audits

Apply change management process to ensure Contract integrity and conformance with the HSR program.

The change management lead shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

Manage the changes in the RM tool.

Demonstrate compliance to the Technical Contract Requirements using the RVTM as specified in Section 2.3.

Certify compliance to critical items using the CIL as specified in Section 2.4.

2.2 Requirements Management Tool

Parse, capture, document, analyze, derive, apportion, trace, manage, verify, and validate Technical Contract Requirements using an RM tool.

Manage the final design, inspection, testing and acceptance documents in the RM tool to allow the automatic export of:

- Requirements Verification Traceability Matrices as specified in Section 2.3.
- Certifiable Items Lists as specified in Section 2.4.

The RM tool requirements:



- The RM tool shall be IBM Rational DOORS, version 9.3 or later
- Provide 3 RM tool floating licenses to the Authority's Representative as defined in the Submittals Section 3.6.
- Follow the procedures of the Verification and Validation Process as defined in this section.
- Train RM tool users in the operation and configuration of the features of the RM tool required enabling them to perform the requirements of this section.
- Enable web access to the RM tool and provide the Authority's Representative with full real-time readability access.
- Create Requirements Verification Traceability Matrices and Certifiable Items Lists directly from the RM tool.
- Submit the RM tool database as defined in Section 3.6.

2.2.1 Parse the Contract for Technical Contract Requirements

- General provisions, special provisions and scope of work and appendices
- Design Criteria Manual
- Directive Drawings
- Mandatory standard specifications
- Standard specifications and standard drawings
- Special specifications
- Preliminary engineering documents
- Other Contract documents containing Technical Contract Requirements, including manuals, reports, drawings, procedures, policies, permits, agreements.

2.2.2 Capture Technical Contract Requirements

- General provisions, special provisions and scope of work and appendices
 - Capture applicable Technical Contract Requirements
- Design Criteria Manual
 - Capture the design criteria.
 - Assess applicability and identify each criterion that is determined to not be applicable to the Contract using RM tool attributes.
- Directive Drawings
 - Capture the directive drawings, use RM tool attributes to identify applicable Technical Contract Requirements



- If directive drawings support design criteria, trace the design criteria to the directive drawings
- Mandatory standard specifications
 - Capture applicable Technical Contract Requirements.
- Standard specifications and drawings
 - Assess each standard specification and standard drawing and determine applicability to Contractor's final design and construction methods
 - If applicable, capture applicable Technical Contract Requirements and follow requirements for Directive Drawings and Mandatory Standard Specifications as described above
- Special specifications
 - Assess each special specification and determine applicability to Contractor's final design and construction methods
 - If applicable, capture applicable Technical Contract Requirements and follow requirements for Mandatory Standard Specifications as described above
- Other Contract documents containing Technical Contract Requirements (e.g. Aesthetic Guidelines for Non-Station Structures)
 - Capture applicable Technical Contract Requirements.
- For each Technical Contract Requirement
 - Capture Contract document reference
 - Capture Contract document section reference
 - Capture Technical Contract Requirement language
 - Do not capture more than 1 Technical Contract Requirement in 1 RM tool requirement
 - Assign unique requirements identifier

2.2.3 Document Technical Contract Requirements

- Store and manage the Technical Contract Requirements in the RM tool.

2.2.4 Analyze Technical Contract Requirements

- Analyze each Technical Contract Requirement and assign one or more requirement type attributes. Requirements types are defined in Section 2.1.2.



2.2.5 Derive Technical Contract Requirements

- Advance Technical Contract Requirements to the final design level in the RM tool, including:
 - General/typical requirements
 - Site specific requirements
- Develop specific, measurable, achievable, and realistic derived requirements for this Contract that can be verified and validated. Document and capture implied requirements, transform performance level requirements and create sub-requirements as required.
- Advance Technical Contract Requirements with the means of supporting documentation, including:
 - Requests for information
 - Studies
 - Analyses, including:
 - Design and code analyses
 - Site-specific hazard analyses
 - Calculations
 - Reports, including the following:
 - Baseline design reports
 - Aesthetic design and review reports
 - Value engineering reports
 - Hydrology and hydraulics reports
 - Geotechnical and foundation reports
 - Structure reports
 - Seismic design reports
 - Phase II hazardous materials
 - Design workshop
 - Agreements
 - Letters
 - Directions
 - Meetings minutes
 - Site inspections



- Parse supporting documentation and capture, document and analyze derived applicable requirements as Technical Contract Requirements.

2.2.6 Apportion Technical Contract Requirements

- Allocate the Technical Contract Requirements to the applicable engineering disciplines and design elements using the RM tool. Engineering disciplines are defined in Section 2.1.3.
- If Technical Contract Requirements are apportioned to 2 or more engineering disciplines or design elements, identify and manage the interfaces using the Interface Management process.

2.2.7 Trace Technical Contract Requirements

- Provide full traceability using the RM tool from the Technical Contract Requirements to the following documents:
 - Derived requirements including supporting documentation
 - Apportioned requirements
 - Baseline design reports
 - Final design documents
 - Ready for construction documents
 - As-built drawings and specifications
 - Interfaces
 - Pending and approved changes including supporting documentation
- Tracing direction shall be top-down, starting with the Technical Contract Requirements.

2.2.8 Manage Technical Contract Requirements

- Baseline the Technical Contract Requirements and associated final design and construction documents:
 - After they have been imported into the RM tool
 - After submittal of the Initial and Final Baseline Design Report
 - After final design submittals (60 percent, 90 percent)
 - After ready for construction submittal
- Follow the Change Management Process for changes to Technical Contract Requirements.
- Add and manage Technical Contract Requirements from Contract and other sources during the life of the Contract as defined in this section, including:
 - Environmental requirements and mitigations as found in the environmental documents including EIR/S, Record of Decision (ROD), permits and approvals



- Safety requirements including hazard mitigations
 - An initial set of Preliminary Hazard Analysis (PHA) mitigations is provided in Book 4
- Security requirements including threat mitigations
 - An initial set of Threat and Vulnerability Assessment (TVA) mitigations is provided in Book 4
- Interoperability items
 - An initial set of interoperability items are provided as part of Appendix A – Interoperability Items.
- Public and third-party outreach, including law enforcing agencies, fire departments, emergency medical services, utilities
- Reviews, including peer reviews
- Directions, letters, meetings, other

2.2.9 Verify Technical Contract Requirements

- Demonstrate compliance to Technical Contract Requirements by provision of objective evidence that:
 - Derived requirements meet Technical Contract Requirements.
 - Apportioned requirements meet Technical Contract Requirements.
 - Final design documents including typical and site specific construction and shop drawings and specifications meet Technical Contract Requirements.
 - Ready for construction drawings and specifications meet final design drawings and specifications.
 - Construction meets ready for construction drawings and specifications.
 - As-built drawings and specifications meet Technical Contract Requirements.
 - Inspection plans and procedures meet Technical Contract Requirements.
 - Test and acceptance plans and procedures meet Technical Contract Requirements.
- Support variances by referencing the approved change(s) as per Section 2.2.7
- Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 2.3.
- Certify compliance to critical requirements using the CIL as specified in Section 2.4.

2.2.10 Validate Technical Contract Requirements

- Demonstrate compliance to Technical Contract Requirements by provision of objective evidence that:



- Construction items meet Technical Contract Requirements as documented in inspection reports.
- Construction items meet Technical Contract Requirements as documented in inspection test and acceptance reports.
- Support variances by referencing the approved change(s) as per Section 2.2.7
- Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 2.3.
- Certify compliance to critical requirements using the CIL as specified in Section 2.4.

2.2.11 Reporting

- Configure the RM tool to allow filtering and exporting for type of requirements, final design, construction, testing, and acceptance documents, including the following:
 - Technical Contract Requirements
 - Derived requirements including supporting documentation
 - Apportioned requirements
 - Final design drawings and specifications
 - Ready for construction drawings and specifications
 - Inspection plans, procedures, and reports
 - Test and acceptance plans, procedures, and reports
 - As-built drawings and specifications
 - Interfaces
 - Pending and approved changes including backup documentation
- When filtered, configure the RM tool to identify incoming and outgoing traces and to export as an RVTM or a CIL as defined in sections 2.3 and 2.4.

Submit the RM tool database to the Authority's Representative as defined in Section 3.6.

2.3 Requirements Verification and Traceability Matrix

Demonstrate compliance to Technical Contract Requirements using the RVTM.

Manage the RVTM in the RM tool. Allow the RVTM to be filtered and exported in Microsoft Word, Excel and Adobe PDF format.

Use the RVTM template as provided in Table 1. Tracing shall be continuous, starting with the Technical Contract Requirements, as shown in the RVTM template.



Provide an RVTM that identifies for each Technical Contract Requirement the appropriate section references to the final design, construction, and testing & acceptance documents. Appropriate section references to these documents shall explain how each Technical Contract Requirement is met, inspected, tested and accepted by the Contractor's final design and construction, including the following:

- Technical Contract Requirement
 - Unique requirements identifier
 - Contract document reference
 - Contract document section reference
 - Technical Contract requirement language
- Final Design
 - Derived requirements
 - Apportioned requirements
 - Allocation to engineering disciplines/design elements
 - Final design document references
 - Final design document section references
- Construction
 - Ready for construction document reference
 - Ready for construction document section reference
 - Inspection plan, procedure and report document references
 - Inspection plan, procedure and report document section references
 - As-built document reference
 - As-built document section reference
- Testing and acceptance
 - Test and acceptance plan, procedure and report document references
 - Test and acceptance plan, procedure and report document section references

When supplying the references, apply the lowest practical level of precision, for example:

- Unique drawing number
- Smallest practical numbered section in a document.

The exported RVTM hardcopy shall be readable by a human being without the need of the RM tool. Provide an uncluttered RVTM without any irrelevant information such as RM tool folder and path names, unrelated attributes, or similar.



Reflect in the RVTM any changes in final design, construction, inspection testing, and acceptance that have been approved by the Authority's Representative.

Technical Exchange Meetings shall be used to apprise the Authority's Representative of the development of the RVTM.

2.3.1 Submittals

Provide an exported RVTM hardcopy and an electronic copy in Microsoft Excel format to the Authority's Representative with every V&V submittal.

2.3.1.1 Final Design

- Preliminary and Final Baseline Design Report
 - Submit RVTM with Technical Contract Requirements captured, analyzed, derived, and apportioned to engineering disciplines and design elements.
 - RVTM shall include complete list of Technical Contract Requirements fully traced to the baseline design report. Using RM tool attributes, clearly demonstrate the following:
 - Which Technical Contract Requirements have been baselined
 - Which Technical Contract Requirements have not been baselined
- 60 Percent Design
 - Submit RVTM with Technical Contract Requirements captured, analyzed, derived, and apportioned to engineering disciplines and final design elements.
 - Demonstrate that each Technical Contract Requirements has been sufficiently advanced (derived) and allocated (apportioned) and which final design document (CDRL) is used to demonstrate compliance.
- 90 Percent Design
 - Submit RVTM with Technical Contract Requirements fully traced to applicable final design documents including section references.
- Other Design Submittals
 - Submit RVTM with apportioned Technical Contract Requirements fully traced to applicable final design documents including section references applicable to the design element.

2.3.1.2 Construction

- Ready for Construction
 - Submit RVTM with Technical Contract Requirements fully traced to applicable ready for construction documents including section references.
- Inspection plans, procedures and reports:



- Submit RVTM with apportioned Technical Contract Requirements fully traced to applicable inspection plans, procedures and reports including section references applicable to the inspected construction element.
- Test/acceptance plans, procedures and reports:
 - Submit RVTM with apportioned Technical Contract Requirements fully traced to applicable testing and acceptance documents including section references applicable to the test/accepted construction element.

2.3.1.3 As-Built

- Submit RVTM with Technical Contract Requirements fully traced to as-built documents including section references.

2.4 Certifiable Items List

Demonstrate compliance to critical items using CILs. Critical items are a subset of the Technical Contract Requirements, including the following:

- Environmental requirements and mitigations as found in the environmental documents including EIR/S, Record of Decision (ROD), permits and approvals
- Safety requirements including hazard mitigations
- Security requirements including threat mitigations
- Interoperability items with other Project contracts

Manage the CIL in the RM tool. Allow the CIL to be filtered by type of critical item and exported in Microsoft Word, Excel and Adobe PDF format.

Use the CIL template as provided in Table 2. An initial set of critical items will be provided as part of the Contract. Refer to Section 2.2, Requirements Management Tool, for details. Coordinate with Authority's Representative and managers of the critical items specified above to populate and manage the CIL.

Flag all Technical Contract Requirements that are critical items using RM tool attributes.

Maintain the list of critical items during the life of the Contract. Treat any item as a Technical Contract Requirement and follow directions in the RM tool as specified in Section 2.2, including capturing, documenting, analyzing, deriving, apportioning, tracing, managing, verifying, and validating of critical items. Tailor Certifiable Items Lists as needed for the specific certification process, such as for Safety and Security certification, including management of PHAs and TVAs.

Develop the CIL based on the RVTM, with extra columns or fields to include the date and initials of the verifier, certifying that the critical item has been incorporated into the final design, construction, inspected, tested, and accepted as appropriate at each stage of development.



Reflect in the CIL any changes in final design, construction, inspection, testing, and acceptance that have been approved by the Authority's Representative.

Technical Exchange Meetings shall be used to apprise the Authority's Representative of the development of the CIL.

Submit an exported CIL hardcopy and an electronic copy to the Authority's Representative as defined in Section 3.6.

2.5 Contractor Verification and Validation Report

Provide a V&V report that accompanies every Technical Contract Submittal.

Use the report to provide an executive summary and certification of compliance with Technical Contract Requirements. Provide additional explanation as necessary on how the Technical Contract Submittal meets the Technical Contract Requirements that is not readily available from the RVTM or CILs. Variances between Technical Contract Requirements and the Technical Contract Submittal shall be explicitly identified and discussed.

The Certification of compliance shall include the confirmation that the references to the objective evidence provided in the RVTM and CILs have been checked by the Contractor's QA/QC process, and have been confirmed as complete and correct.

The Contractor may choose to provide the content of the V&V report as part of the submittal letter.

2.6 Contractor Verification and Validation Submittal

Provide a V&V submittal with every Technical Contract Submittal.

Contractor V&V submittal includes the following:

- RM tool database copy as defined in Section 2.2
- RVTM as defined in Section 2.3
- CILs as defined in Section 2.4
- Contractor V&V report as defined in Section 2.5

The Contractor V&V submittal shall enable the Independent Checking Engineer and Independent Site Engineer (Section 3.4) to perform a full compliance check against the Technical Contract Requirements.

The Contractor V&V submittal shall enable the Authority's Representative (Section 3.4.9) to perform a compliance review against the Technical Contract Requirements.



3 Execution

3.1 Self-certification Process Overview

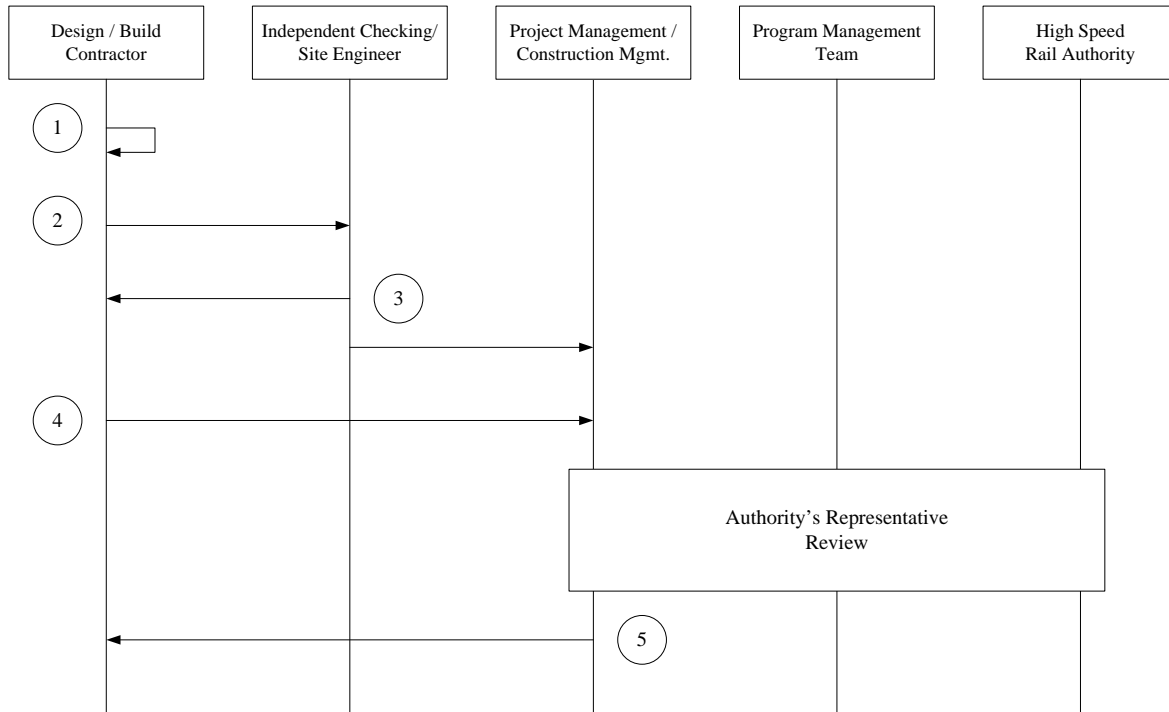


Figure 2: Self-Certification Process

Follow the self-certification process as presented in Figure 2.

1. Contractor shall prepare Technical Contract Submittal (including final design, construction, inspection and test submittals) as specified in the Contract and shall perform quality procedures as stipulated by the Contract. Contractor shall self-certify compliance with Contract Requirements and fitness for purpose.
2. Contractor shall submit Technical Contract Submittal together with Contractor V&V submittal (Section 2.6) to Independent Checking Engineer (ICE) and Independent Site Engineer (ISE).
3. Independent Checking Engineer and Independent Site Engineer shall assess and evaluate the Technical Contract Submittal in order to be able to certify that the final design/construction meets the Contract Requirements as detailed in the Contract and as reasonably inferred therefrom. ICE/ISE shall submit an assessment report and certification to the Authority's Representative with a copy to the Contractor.



4. Contractor shall submit Technical Contract Submittal, including self-certification, Contractor V&V submittal, ICE/ISE assessment report, and certification to the Authority's Representative.
5. The Authority's Representative will perform audit and re-review as required and issue Statement of No Objection (SONO) or Approval, if given, based upon audit and additional review results and ICE/ISE assessment report and certificate.

Unless otherwise noted, the following steps apply to each type of Technical Contract submittal.

Technical Contract Submittal	Step 1	Step 2	Step 3	Step 4	Step 5
Prepared, no submittal to Authority	Yes	Yes	Yes	No	No
Submitted for Information	Yes	Yes	Yes	Yes	No
Submitted for SONO	Yes	Yes	Yes	Yes	Yes
Submitted for Approval	Yes	Yes	Yes	Yes	Yes

3.2 Self-certification Process Involving Third Party Entities

Third party entities include jurisdictional authorities (Caltrans, cities, and counties), railroads, utilities as defined in detail in the CSHTP Scope of Work and the General Provisions.

Contractor shall apply V&V and self-certification as follows:

- CHSTP Work¹ affecting CHSTP Technical Contract Requirements (TCR):
 - Contractor shall follow full V&V and self-certification requirements
- CHSTP Work affecting third party entities and NOT affecting CHSTP TCRs:
 - Contractor shall be responsible that the CHSTP Work is planned, executed, monitored, controlled and is in compliance with the CHSTP Work
 - Contractor shall demonstrate compliance to the applicable CHSTP Work using full V&V and self-certification requirements
 - Contractor and/or third party entity shall follow the third party entity requirements, policies, codes, standards, processes, delivery methods as applicable
- Third party entity Work affecting CHSTP TCRs:
 - Contractor shall be responsible that the third party entity Work is planned, executed, monitored, controlled and is in compliance with the CHSTP TCRs
 - Contractor shall demonstrate compliance to the affected CHSTP TCRs using full V&V and self-certification requirements

¹ As defined in the General Provisions



- Contractor and/or third party entity shall follow the third party entity requirements, policies, codes, standards, processes, delivery methods as applicable
- Third party entity Work affecting other third party entities:
 - This Work is considered outside the CHSTP Work and CHSTP TCRs, CHSTP V&V and self-certification requirements do not apply
 - Contractor and/or third party entity shall follow the third party entity requirements, policies, codes, standards, processes, delivery methods as applicable

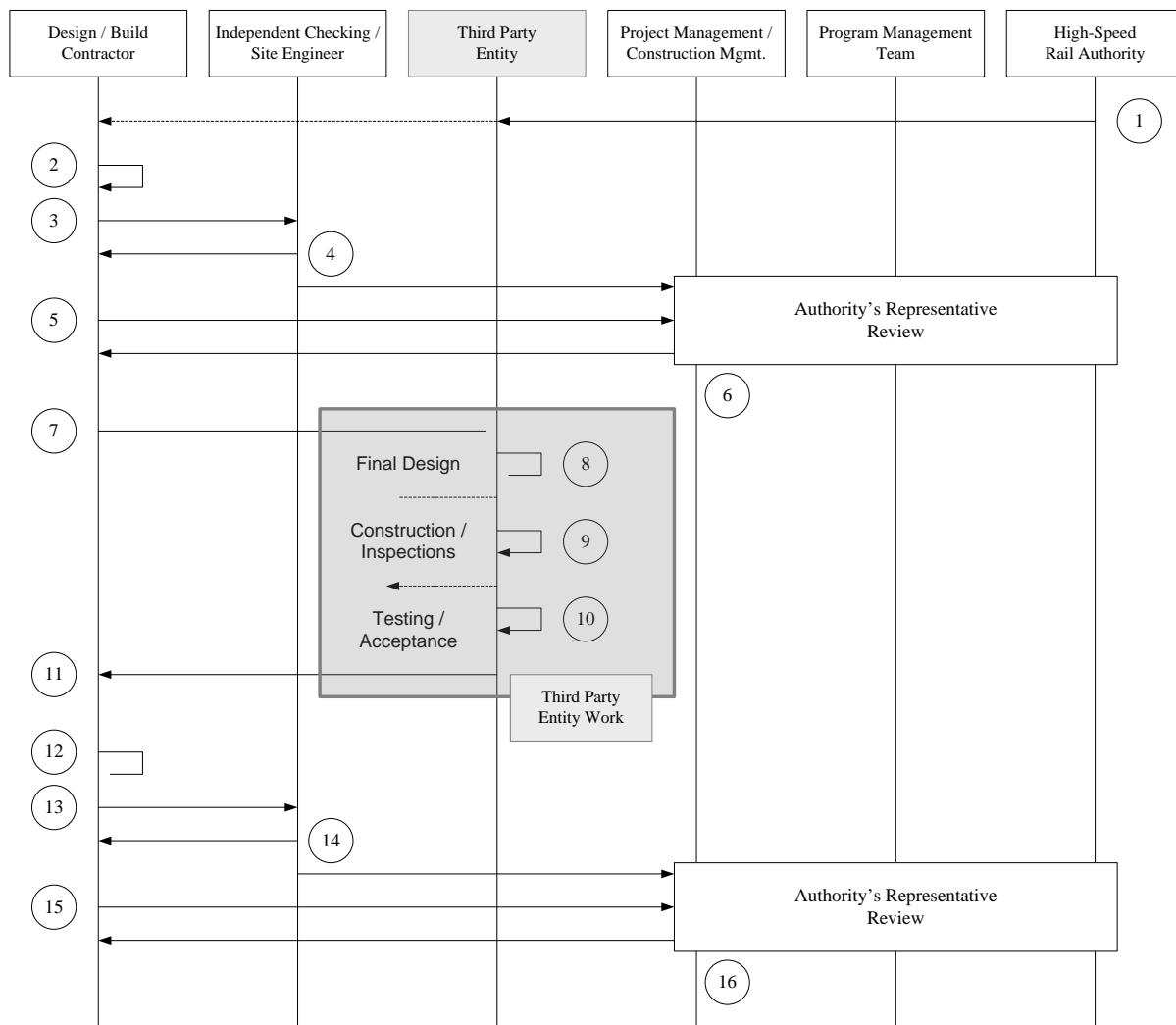


Figure 3: Self-Certification Process Involving Third Party Entities

Follow the self-certification process involving Third Party Entities as presented in Figure 3.

1. Authority issues Contract to third party entity. Alternatively, third party entity Work may be prepared directly by the Contractor.



2. Contractor shall assess the impact of the third party entity Work to the CHSTP Work, Technical Contract Requirements and shall confirm that third party entity Work is compliance with CHSTP Work and TCRs. Any discrepancies shall be brought to the attention to the Authority's Representative. Contractor shall perform quality procedures as stipulated by the Contract. Contractor shall self-certify compliance with Contract Requirements and fitness for purpose.
3. Refer to Figure 2, Self-Certification Process, step 2.
4. Refer to Figure 2, Self-Certification Process, step 3.
5. Refer to Figure 2, Self-Certification Process, step 4.
6. Refer to Figure 2, Self-Certification Process, step 5.
7. Contractor shall provide Work to third party entity, or if Work was directly provided from Authority, coordinate with third party entity to ensure compliance with applicable CHSTP Work and TCRs.
8. Contractor and/or third party entity prepare final design. Contractor shall coordinate with third party entity to ensure compliance with applicable CHSTP Work and TCRs.
9. Contractor and/or third party entity perform construction and inspections. Contractor shall coordinate with third party entity to ensure compliance with applicable CHSTP Work and TCRs.
10. Contractor and/or third party entity perform testing and acceptance. Contractor shall coordinate with third party entity to ensure compliance with applicable CHSTP Work and TCRs.
11. Third party entity hands over Work to Contractor. Alternatively, Work may be handed over to Authority.
12. Contractor shall perform quality procedures for the applicable CHSTP Work and TCRs as stipulated by the Contract. Contractor shall self-certify that Work performed by Contractor or third party entity is compliance with Contract Requirements and fitness for purpose.
13. Refer to Figure 2, Self-Certification Process, step 2.
14. Refer to Figure 2, Self-Certification Process, step 3.
15. Refer to Figure 2, Self-Certification Process, step 4.
16. Refer to Figure 2, Self-Certification Process, step 5.



3.3 Contractor Verification and Validation Requirements

3.3.1 Contractor V&V Key Personnel

Employ only professionals with at least 10 years of experience in the stated field of expertise for key positions with a proven track record as supported by their resumes:

- Federal projects with Federal Transit Administration or Federal Rail Administration oversight
- Design/Build contracts
- Systems Engineering
- Verification and Validation

The positions listed below shall be the minimum to be considered V&V key positions:

- Verification and validation management
- Requirements management
- Design management
- Interface management
- Inspection and testing management
- Change management

The Authority's Representative may designate other positions as V&V key positions or reduce the number of such positions at any time during the Contract.

Do not share key positions between more than 1 person. One person can hold more than one key position.

Submit resumes of key employees to the Authority's Representative.

3.3.2 Verification and Validation Plan

Prepare and submit a Contractor VVP in compliance with the requirements defined in Section 2.1.

Follow the V&V procedures, as defined in Section 2.1 and as documented in the Contractor VVP, including the following:

- Verification and validation management
- Requirements management
- Design management
- Interface management



- Inspection and testing management
- Change management

3.3.3 Requirements Management Tool

Procure an RM tool and follow directions in compliance with the requirements defined in Section 2.2.

3.3.4 Requirements Verification Traceability Matrix

Prepare and submit RVTMs in compliance with the requirements defined in Section 2.3.

3.3.5 Certifiable Items Lists

Prepare and submit CILs in compliance with the requirements defined in Section 2.4.

3.3.6 Verification and Validation Reports

Prepare and submit V&V reports in compliance with the requirements defined in Section 2.5.

3.4 Independent Checking Engineer and Independent Site Engineer

Contractor shall retain the services of qualified independent engineering consulting firm(s) to serve as its Independent Checking Engineer (ICE) and Independent Site Engineer (ISE) performing independent verification and validation (IV&V) for the duration of the Contract. Every Technical Contract Submittal shall be fully checked by the ICE during final design and the ISE during construction before submittal to the Authority.

The Contractor may choose to divide the checking and site engineering services between two professional engineering firms.

Contractor shall obtain approval from the Authority's Representative of the independent engineering consulting firm(s) prior to retention. Any replacement of a previously approved ICE/ISE firm is subject to the prior written approval of the Authority. The following additional requirements shall apply:

- The Authority shall have the right to request that the ICE/ISE firm or any personnel assigned as the ICE/ISE be replaced with or without cause at its sole discretion, without additional cost to the Authority
- The Contractor shall be prohibited from changing any of its ICE/ISE personnel without prior written approval by the Authority
- The Authority shall be given the right to review qualifications of ICE/ISE personnel and to approve/disapprove of such individual in such position



3.4.1 General ICE/ISE Requirements

The ICE/ISE shall not be associated in any way with or be a subsidiary or affiliate of any other firm engaged by the Contractor to perform any other work under this Contract. The ICE/ISE shall not be involved in actually producing final design documents or conducting construction site supervision for the Contract.

The ICE/ISE shall not work directly for nor report to the Contractor's Project, Engineering/Design, Construction or Test Manager. The ICE/ISE shall be directly responsible to and report to a senior management or similar level of the Contractor's organization not directly responsible for engineering/design, construction or testing. Furthermore, the ICE/ISE shall report directly to the Authority's Representative.

The ICE/ISE staff shall be located in California for the duration of their work except for ICE/ISE staff required to perform ICE/ISE function at sites of work located elsewhere. The ICE/ISE shall be represented at all times by staff whose seniority and experience are appropriate to the Works, and whose representation is available as necessary and as required by the Authority's Representative for discussions and meetings with the Authority's Representative.

3.4.2 ICE/ISE Role

The ICE/ISE shall assess and evaluate the Technical Contract Submittals in order to be able to certify that the final design and construction meets the Contract Requirements as detailed in the Contract and as reasonably inferred therefrom.

3.4.3 ICE/ISE Qualifications

The ICE/ISE firm shall:

- Be a well-established professional firm (20+ years) with experience in the rail transportation industry with Federal Transit Administration or Federal Rail Administration oversight
- Meet the same professional registration requirements as the designers
- Have relevant project experience as a primary designer in:
 - Design and construction in similar conditions
 - Seismic design for viaducts/bridges
 - Deep foundations and earthwork design in soft ground
 - Geotechnical earthquake engineering analysis and design
- Have adequate resources to meet the requirements of the Contract
- Have been involved in major projects within the past 5 years involving work of similar nature as that represented by this Contract
- Have previous experience in an IV&V role



- Have academically and professionally qualified staff assigned to the Contract, with an adequate level of experience, including the construction phase, as specified in Section 3.3.1
- Have a local site office established with a senior management representative always available within 24 hours notice; and
- Have a QA/QC system that is based upon ISO 9001 standards

3.4.4 ICE/ISE Duties

The ICE/ISE's verification and validation activities shall include, as a minimum, assessment and evaluation of:

- Final design submittals, including the following:
 - Preliminary and final baseline design report
 - 60 percent design
 - 90 percent design
 - Other design submittals
- Construction
 - Ready for construction documents
 - Inspection plans and procedures
 - Witness of inspections and check inspection reports
 - Test and acceptance plans and procedures
 - Witness of testing/acceptance and check testing/acceptance reports
- As-built
 - As-built documents
- Design changes

The ICE/ISE shall conduct its assessment and evaluation of final design and construction such that the ICE/ISE can certify to the Contractor and to the Authority's Representative that the final design and construction satisfies the Contract requirements, including those for the following:

- Accuracy
- Adequacy
- Conformance to standards of practice
- Compliance with codes and standards
- Cost effectiveness
- Quality, and



- Fitness for purpose and/or function as specified and/or implied in the Contract.

The ICE/ISE shall check that section references provided in the RVTM and CILs created by the Contractor demonstrate compliance to the following Technical Contract Requirement and critical items:

- Derived and apportioned requirements conform to Technical Contract Requirements
- Final design documents including reports, analyses, drawings and specifications conform to Technical Contract Requirements
- Ready for construction drawings and specifications conform to final design drawings and specifications
- Construction items conforms to ready for construction drawings and specifications
- As-built drawings and specifications conform to construction items
- Inspection plans and procedures meet Technical Contract Requirements
- Inspection reports demonstrate Construction items conform to Technical Contract Requirements
- Test and acceptance plans and procedures meet Technical Contract Requirements
- Test and acceptance reports demonstrate Construction items conform to Technical Contract Requirements

3.4.5 ICE/ISE Independent Design Assessments and Analytical Design Checks

The ICE/ISE shall carry out independent design assessments and analytical design checks as addressed in the following sub-sections.

3.4.5.1 Independent Design Assessments

The ICE/ISE shall the review the Technical Contract Submittals for compliance with the Contract as specified in Section 3.4.4, taking into consideration the proposed method of construction, and shall include the following areas:

- Loads
- Codes and standards
- Methods of analysis
- Computer software and its validation
- Interface requirements
- Maintenance requirements
- Materials and material properties
- Durability requirements



- Fatigue performance

3.4.5.2 Independent Analytical Check

The ICE/ISE shall use separate calculations (without reference to Contractor's calculations) to establish the structural adequacy and integrity of structural members, including the following:

- The structural geometry and modeling
- Material properties
- Member/section properties
- Loading intensities
- Structural boundary conditions

The ICE/ISE shall sign and seal all independent structural calculations.

3.4.6 ICE/ISE Deliverables

- Assessment Plan, including the following:
 - Contract life cycle phases (notice to proceed, final design, construction, and testing/acceptance)
 - Deliverables for each phase
 - Activities for each deliverable
 - Responsibility assignment matrix for deliverables and activities
 - Tools and methods used
 - Inputs used for each phase
 - Stakeholder coordination
 - Metrics used to measure and report progress
- Assessment Report and Certificates with each Technical Contract Submittal
- Monthly Progress and Status Report, including:
 - Progress achieved in the month
 - Assessments performed in the month
 - Work schedule for the following month
 - Resource availability and deployment in the month
 - Resource availability and proposed deployment for the following month
 - Key issues for comment, discussion or Authority Representative's immediate attention comments
 - Recommendations



- Quarterly Progress and Status Report, including the following:
 - A summary report on the assessments completed during the quarter
 - A summary of any problems resolved during the quarter
 - A summary of outstanding issues and proposed follow-up action
 - A commentary on verification and validation issues
 - Outlook on IV&V issues for the following quarter
 - Overall comments and recommendations

3.4.7 Design Revisions

Any changes to final design or construction elements already checked by the ICE/ISE shall be dealt with as an entirely new submission and shall be re-checked by the ICE/ISE.

3.4.8 Independent Verification and Validation

The independent verification and validation by the ICE/ISE shall not relieve the Contractor from carrying out all the checks and reviews that a professional and prudent Contractor would normally carry out on the type of work which is actually being designed.

3.4.9 Contractor and ICE/ISE Disagreement

If at any time the Contractor and the ICE/ISE have any significant disagreement, regardless whether it is later resolved, the ICE/ISE shall be under a duty to report that fact as soon as possible in the next Progress Report to the Authority's Representative.

3.5 Authority's Representative Review

Upon submittal of Technical Contract Submittals, the Authority's Representative will perform an audit of the Contractor's and Independent Checking Engineer and Independent Site Engineer's adherence to the verification and validation process and re-check the submittal as deemed necessary.

The Authority's Representative may require consultations with the ICE/ISE, Contractor, or the Contractor's engineers for the various disciplines involved in the part of the work under review. The Contractor shall ensure that the relevant staff is available to participate in such consultations.

The Authority's Representative may request additional reviews as considered necessary to ensure a continued and uniform consistency in the quality and effective incorporation of revisions to submittals and/or the Contractor may request additional reviews to facilitate release of designs for construction.



3.6 V&V Submittals

V&V Deliverables listed below are subject to SONO except when identified for Approval, Information, or not required to be submitted to Authority in the Contract..

Section	Deliverable	Timeframe
V&V Process Management		
2.1	VVP – Draft	60 days after NTP
	VVP – Final	90 days after NTP
	VVP – Update	Other design submittals
2.2	RM Tool – Floating Licenses	30 days after NTP
	RM Tool – Database	Monthly
3.2	Key Personnel Resumes	Mobilization phase and prior to hiring
3.4	ICE/ISE Assessment Plan – Draft	60 days after NTP
3.4	ICE/ISE Assessment Plan – Final	90 days after NTP
3.4	ICE/ISE Monthly Progress and Status Report	Monthly
3.4	ICE/ISE Quarterly Progress and Status Report	Quarterly
Baseline Design Report Submittals		
2.2	RM Tool Database Copy	Baseline design report submittal
2.3	RVTM – Technical Contract Requirements	Baseline design report submittal
2.4	CIL – Critical Items	Baseline design report submittal
2.5	V&V Report	Baseline design report submittal
3.1	Contractor Self Certification	Baseline design report submittal
3.4	ICE/ISE Assessment Report and Certificate	Baseline design report submittal
Final Design Milestone Submittals		
2.2	RM Tool Database Copy	Milestone design submittals
2.3	RVTM – Technical Contract Requirements	Milestone design submittals
2.4	CIL – Critical Items	Milestone design submittals
2.5	V&V Report	Milestone design submittals
3.1	Contractor Self Certification	Milestone design submittals
3.4	ICE/ISE Assessment Report and Certificate	Milestone design submittals
Other Submittals		
2.2	RM Tool Database Copy	Other design submittals
2.3	RVTM – Apportioned Requirements	Other design submittals
2.4	CIL – Apportioned Critical Items	Other design submittals
2.5	V&V Report	Other design submittals
3.1	Contractor Self Certification	Other design submittals
3.4	ICE/ISE Assessment Report and Certificate	Other design submittals
Construction Submittals: Plans, Procedures, and Reports		
2.2	RM Tool Database Copy	Construction submittals
2.3	RVTM – Apportioned Requirements	Construction submittals



2.4	CIL – Apportioned Critical Items	Construction submittals
2.5	V&V Report	Construction submittals
3.1	Contractor Self Certification	Construction submittals
3.4	ICE/ISE Assessment Report and Certificate	Construction submittals
As-Built Submittal: Plans, Procedures, and Reports		
2.2	RM Tool Database Copy	As-built submittals
2.3	RVTM – Apportioned Requirements	As-built submittals
2.4	CIL – Apportioned Critical Items	As-built submittals
2.5	V&V Report	As-built submittals
3.1	Contractor Self Certification	As-built submittals
3.4	ICE/ISE Assessment Report and Certificate	As-built submittals



Table 1: RVTM Template

Technical Contract Requirement				Final Design					Construction		Testing/Acceptance	
				Requirements		Design						
Req. ID	Doc. ID	Document Section	Requirements Text	Derived Requirements	Apportioned Requirements	Allocation	Doc. ID/Name	Section	Doc. ID/Name	Section	Doc. ID/Name	Section
1	Design Criteria	4.4.5.3 Unbalanced Superelevation	The maximum unbalanced superelevation (Eu) shall be limited to 3 inches	N/A	N/A	Track Geometry	Drawing Set (e.g., Plan & Profile)	Drawing #	...	...	...	...
2	Design Criteria	5.8.2 Subballast or Asphalt Underlayment	The thickness shall be determined by analysis of the support required.	The thickness shall be xxx inches.	N/A	Track	Report ...	Section #	...	...	...	...
							Cross Section (Typical)	Drawing #	N/A	N/A	...	...
							Cross Section (Site Specific)	Drawing #	Drawing Set (Released for Construction)	Drawing #	...	...
									Inspection (Plan, Procedure, Report)	Section #	...	...
									Drawing Set (As Constructed)	Drawing #	...	...
									...		Test/Acceptance (Plan, Procedure, Report)	Section #
3	Design Criteria	1.9 Climatic Conditions	Climatic conditions necessary for design, including those that are site-specific, shall be researched and considered by the designer	The design wind speed shall ...	Wind loads on structures shall consider the design wind speed (velocity) as defined ...	Structures	Report ...	Section #	...	...	...	...
4	PHA	1.1.1.4 Derailment due to Washout	Perform hydraulics analysis and incorporate results into sub-grade design, slope protection, and setting of profile.	Hydraulics analysis shall ...	N/A	Geotech	...	...	...	...	...	...
					Sub-grade shall ...	Track	...	...	...	...	...	...
					Slope protection shall ...	Civil		...	...	...	...	...
					Setting of profile shall ...	Track Geometry		...	...	...	...	...
			Install appropriate drainage.	Drainage system shall ...	...	Drainage	...	...	...	...	...	...
			Inspection and maintenance of drainage systems.	...	...	O&M	...	...	...	...	...
			Identification and monitoring by O&M of potential hazardous locations.	...	...	O&M	...	...	...	...	...
			Notes: RVTM template to be used by Contractor Content for illustration purposes only For detailed RVTM requirements refer to Contract Follow document control procedures for header and footer						Legend: Req. Requirement Doc. Document ID Identifier			



Table 2: CIL Template

Technical Contract Requirement				Final Design						Construction		Testing/Acceptance	
				Requirements		Design			Certification		Certification		Certification
Req. ID	Doc. ID	Document Section	Requirements Text	Derived Requirements	Apportioned Requirements	Allocation	Doc. ID/Name	Section	Certified By & Date	Content as per RVTM	Certified By & Date	Content as per RVTM	Certified By & Date
1	PHA	1.1.1.4 Derailment due to Washout	Perform hydraulics analysis and incorporate results into sub-grade design, slope protection, and setting of profile.	Hydraulics analysis shall ...	N/A	Geotech	...	...	...	...	...	...	...
					Sub-grade shall ...	Track	...	...	...	...	...	...	...
					Slope protection shall ...	Civil		...	...	...	...	...	...
					Setting of profile shall ...	Track Geometry		...	...	...	...	...	...
			Install appropriate drainage.	Drainage system shall ...	...	Drainage	...	...	...	...	...	...	...
			Inspection and maintenance of drainage systems.	...	...	O&M	...	...	...	...	...	...	...
			Identification and monitoring by O&M of potential hazardous locations.	...	...	O&M	...	...	...	...	...	...	...
Notes: CIL template to be used by Contractor Content for illustration purposes only For detailed CIL requirements refer to Contract Follow document control procedures for header and footer						Legend: Req. Requirement Doc. Document ID Identifier							



4 Appendix A – Interoperability Items

This appendix contains an initial list of Interoperability Items. It is preceded by a table of contents of the list, and followed by a legend of abbreviations.

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	1.1.1.1 Interfaces with Guideway (excl. Trackwork)	
IF 1233	1.1.1.1.1 Interface between GEN Reliability & Availability Targets and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable GEN RAMS targets have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Reliability • Availability • ... 	DCM, 1.4.6, Design Life DCM, 1.5, Durability DCM, 10.8.6, Soil Materials Used for Embankments DCM, 12.4.1, Structural Design Parameters DCM, 12.8.6.8, Expansion Joints DCM, 12.8.6.9, Bearings DCM, 12.11.3.5, Water tightness DCM, 13.6.3, Durability DCM, 8.1, Scope DCM, 8.5.3.1, Design Elements DCM, 9.5.3, Encroachment Justifications Scope of Work, 5.10.1, Reliability of the Drainage Subsystem
	2 Operations & Maintenance	
	2.1 Operations	
	2.1.1 Train Service/Operating Plan	
	2.1.1.1 Interfaces with Guideway (excl. Trackwork)	
IF 230	2.1.1.1.1 Interface between O&M Service/Operating Plan and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M service/operating plan requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Track capacity • Crossover spacing between stations • Crossover spacing in proximity to stations • Track alignment at stations (station siding tracks) 	Concept of Operations, 5.1, Operational Scope of the High-Speed System Concept of Operations, 5.4, Planned Capabilities Concept of Operations, 6.3.1.1, Turnouts and Crossovers Concept of Operations, 8.14.1, CHST Mainline Corridor Concept of Operations, 8.4.1, Full Build Timetable Schedule DCM, 1.2.6, Trip Travel Times DCM, 4.10, High-Speed Crossovers



ID	Interface	Document Reference(s)
	• ...	DCM, 4.13, Track Layout along Station Platforms DCM, 4.4, Horizontal Alignment
	2.1.2 Operating & Design Speeds	
	2.1.2.1 Interfaces with Guideway (excl. Trackwork)	
IF 355	2.1.2.1.1 Interface between O&M Maximum Design Speed @ HST Tracks and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M maximum design speed at HST tracks has been applied by the INF team.	
	<u>Specification:</u> Defines the O&M maximum design speed at HST tracks, specified by the O&M team, including but not limited to: <ul style="list-style-type: none"> • Minimum alignment segment lengths • Minimum radii • Actual superelevation • Unbalanced superelevation • Minimum spiral curve lengths • Minimum vertical curve lengths • Distance between track center lines • Maximum pressure variations in trenches • Maximum pressure variations in tunnels 	DCM, 4.4.2, Minimum Lengths of Alignment Segments DCM, 4.4.5.2, Actual Superelevation DCM, 4.5.2.2, Vertical Curve Lengths (LVC) DCM, 4.4.3, Minimum Radii DCM, 4.4.5.3, Unbalanced Superelevation DCM, 4.4.6.3, Spiral Lengths DCM, 1.2.5, Design and Operating Speeds DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.5, Track Center Spacing Concept of Operations, 4.3, The High-Speed Train System Strategy
IF 4355	2.1.2.1.2 Interface between O&M Maximum Design Speed @ Special Trackwork and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M maximum design speed at special trackwork has been applied by the INF team.	DCM, 4.10, High-Speed Crossovers DCM, 4.7, High-Speed Turnouts (60 mph and faster)
	2.1.3 Physical Requirements	
	2.1.3.1 Interfaces with Guideway (excl. Trackwork)	
IF 597	2.1.3.1.1 Interface between O&M Visibility of Wayside/Trackside Equipment Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M visibility of wayside/trackside equipment requirements have been applied by the INF	Concept of Operations, 6.3.1, Track DCM, 3.4, Vehicle Clearance Envelopes



ID	Interface	Document Reference(s)
	team.	
	2.2 Maintenance	
	2.2.1 Interfaces with Guideway (excl. Trackwork)	
	2.2.1.1 Mol Roadway Access	
IF 911	2.2.1.1.1 Interface between O&M Mol Infrastructure Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol infrastructure access requirements have been addressed by the INF team.	DCM, 12.4.1, Structural Design Parameters DCM, 12.8, Design Considerations for Aerial Trackways and Structures DCM, 13.15.6, Fencing DCM, 13.16.21, Parking for Tunnel Maintenance and Traction Power Facility DCM, 13.16.4.2, Fixed Facility Power DCM, 13.16.5, Access Road DCM, 7.7.1.1, Access Roads DCM, 7.8.1.5, Gates Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-401, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-404, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, FRONT ELEVATION Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-407, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Maintenance of Infrastructure, 2, CHST Infrastructure System And Maintainability Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 9.3.1, Tunnels Maintenance of Infrastructure, 9.3.2, Bridges and Aerial Structures Maintenance of Infrastructure, 9.3.3, Depressed Structures Maintenance of Infrastructure, 9.4, Right of Way Access



ID	Interface	Document Reference(s)
	2.2.1.2 Mol Walkway & Stairs	
IF 843	2.2.1.2.1 Interface between O&M Mol Walkway Spatial Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the O&M Mol walkway spatial requirements have been addressed by the INF team.</p>	<p>DCM, 12.14.1, Cable Trough DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls DCM, 13.15.5, Design Requirements for Cable Troughs DCM, 13.3.6, Walkways DCM, 3.2, Regulations, Codes, Standards, and Guidelines DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.4.4, Effects of Superelevation DCM, 3.5, Track Center Spacing DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 7.7.7, Walkways and Cable Trough Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT Drawing DD-CV-002, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, OPEN CUT Drawing DD-CV-003, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL Drawing DD-CV-004, TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT Drawing DD-CV-005, TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-002, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p>



ID	Interface	Document Reference(s)
		<p>Drawing DD-ST-011, TYPICAL CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL</p> <p>Drawing DD-ST-012, CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-FRADE / CUT & COVER TUNNEL</p> <p>Drawing DD-ST-013, TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>Drawing DD-ST-017, TYPICAL CROSS SECTION, AERIAL STRUCTURE, FOUR TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER</p> <p>Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY</p> <p>Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH</p> <p>Drawing DD-TN-102, TYPICAL CROSS SECTION, DOUBLE TRACK MINED TUNNEL, WITH SEPARATION WALL</p> <p>Drawing DD-TN-103, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITH SEPARATION WALL</p> <p>Drawing DD-TN-104, TYPICAL CROSS SECTION , TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-105, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITHOUT SEPARATION</p> <p>Drawing DD-TN-111, TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT</p> <p>Drawing DD-TN-112, TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT</p> <p>Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS</p> <p>Drawing DD-TN-200, BASIC TUNNEL CONFIGURATION, SINGLE TRACK TWIN TBM BORED TUNNEL, DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-201, BASIC TUNNEL CONFIGURATION SINGLE TRACK TWIN TBM BORED TUNNEL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-203, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-204, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL, DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-205, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-206, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-207, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)</p>



ID	Interface	Document Reference(s)
		Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL Maintenance of Infrastructure, 1.2.6, CHST and PUC Standards Maintenance of Infrastructure, 7.6.1, California Public Utilities Commission (CPUC)
IF 912	2.2.1.2.2 Interface between O&M Mol Access Stairway Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol access stairway spatial requirements have been addressed by the INF team.	Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-ST-008, AERIAL STRUCTURE, BRIDGE EMERGENCY EXIT STAIRWAY DETAILS 1 Drawing DD-ST-009, AERIAL STRUCTURE, BRIDGE EMERGENCY EXIT STAIRWAY DETAILS 2 Concept of Operations, 6.3.5.2, Aerial Right-of-Way Maintenance of Infrastructure, 9.3.2, Bridges and Aerial Structures Maintenance of Infrastructure, 9.3.3, Depressed Structures DCM, 7.8.1.5, Gates DCM, 7.8.2.6, Trackway on Aerial Structure DCM, 7.8.2.7, Trackway on Retained Fill DCM, 12.14.7, Access Stairs DCM, 12.8.8, Emergency Access DCM, 12.10.8, Trench Emergency Exits DCM, 7.7.11, Emergency Stairs Maintenance of Infrastructure, 9.4, Right of Way Access
	2.2.1.3 Mol Live Loads	
IF 3481	2.2.1.3.1 Interface between O&M Mol Walkway Floor Live Load Requirements and GWY Infrastructure	



ID	Interface	Document Reference(s)
	<u>Purpose/Scope:</u> Ensures that the O&M Mol walkway live load requirements have been addressed by the INF team.	DCM, 12.11.2.9, Miscellaneous Loads DCM, 12.11.2.9.1, Cut-and-Cover Walkway Cover Live Loads DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 12.7.1.4, Floor Load DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls DCM, 7.7.7, Walkways and Cable Trough Maintenance of Infrastructure, 5, Maintenance Of Infrastructure Equipment And Vehicles
IF 3839	2.2.1.3.2 Interface between O&M Mol Access Stairway Live Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol access stairway live load requirements have been addressed by the INF team.	DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 12.7.1.4, Floor Load Maintenance of Infrastructure, 5, Maintenance Of Infrastructure Equipment And Vehicles
	2.2.1.4 Mol Equipment	
IF 512	2.2.1.4.1 Interface between O&M Mol Equipment Dynamic Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol equipment dynamic envelope requirements have been addressed by the INF team.	DCM, 3.1, Scope DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.1, Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM, 3.7.2, Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation Maintenance of Infrastructure, 1.2.6, CHST and PUC Standards Maintenance of Infrastructure, 5, Maintenance Of Infrastructure Equipment And Vehicles Maintenance of Infrastructure, 5.1, Typical MOI Equipment
IF 3691	2.2.1.4.2 Interface between O&M Mol Equipment Axle Loads Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol equipment axle loads have been addressed by the INF team.	DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 13.9.5, Fatigue Analysis DCM, 9.5.4.5, Placement Maintenance of Infrastructure, 5, Maintenance Of Infrastructure Equipment



ID	Interface	Document Reference(s)
		And Vehicles Maintenance of Infrastructure, 5.1, Typical MOI Equipment
IF 3678	2.2.1.4.3 Interface between O&M MOI Equipment Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MOI equipment dynamic train-structure interaction has been addressed by the INF team.	DCM, 12.5.2.2, Vertical Impact Effect (I) DCM, 12.6, Track-Structure Interaction DCM, 13.9.3, Dynamic Analysis Maintenance of Infrastructure, 5.1, Typical MOI Equipment
	2.2.1.5 MOI Maintainability & Ease of Maintenance	
IF 2586	2.2.1.5.1 Interface between O&M MOI CIV Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M MOI CIV maintainability & ease of maintenance requirements have been addressed by the INF team.	DCM, 1.4, General Design Parameters DCM, 1.5, Durability DCM, 3.5, Track Center Spacing DCM, 7.3, Grading, Side Slopes, and Retaining Walls for Roadway and Site Embankments DCM, 7.5, Slope/Surface Protection Systems Best Management Practices DCM, 7.7.4, Signage
IF 5892	2.2.1.5.2 Interface between O&M MOI STR Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M MOI STR maintainability & ease of maintenance requirements have been addressed by the INF team.	DCM, 1.4, General Design Parameters DCM, 1.5, Durability DCM, 12.11.3.5, Water tightness DCM, 12.4.1, Structural Design Parameters DCM, 12.6.4, Track Serviceability Analysis DCM, 12.6.4.2, Vertical Deflection Limits: Group 1a DCM, 12.6.4.3, Vertical Deflection Limits: Group 1b DCM, 12.6.4.5, Transverse Deflection Limits DCM, 12.8, Design Considerations for Aerial Trackways and Structures DCM, 12.8.10, Maintenance of HST Structures DCM, 12.8.4.6, Inspection and Maintenance DCM, 12.8.5.4, Maintenance and Inspection of Concrete Structures DCM, 12.8.6.8, Expansion Joints



ID	Interface	Document Reference(s)
		DCM, 12.9.2, Requirements for Highway Bridges DCM, 3.5, Track Center Spacing Maintenance of Infrastructure, 10.3.9, Replacement of Bridge Structure/Components Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 9.3, Structures Maintenance of Infrastructure, 9.3.2, Bridges and Aerial Structures Maintenance of Infrastructure, 9.3.3, Depressed Structures
IF 1203	2.2.1.5.3 Interface between O&M Mol DRN Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol DRN maintainability & ease of maintenance requirements have been addressed by the INF team.	DCM, 8.5.2.1, Open Channel Hydraulics DCM, 8.5.2.1.6, Channel Lining DCM, 8.5.2.3, Underdrain System DCM, 8.5.2.3.4, Access Holes/Cleanouts and Risers DCM, 8.5.2.5, Siphons DCM, 8.5.2.5.4, Collars and Blowoff Structures DCM, 8.5.2.6, Pump Stations DCM, 8.6.1, Track Drainage Systems DCM, 8.6.3.4, Deck Drainage System DCM, 8.6.3.4.3, Pipes and Downspouts DCM, 8.6.9.2, Storm Drain Design DCM, 8.6.9.3, Inlets and Maintenance Access DCM, 8.6.9.4, Pipe Characteristics Drawing SD-CD-001, TRACK DRAIN / UNDERDRAIN, CLEANOUT & RISER DETAILS Drawing SD-CD-003, STORM DRAIN MAN HOLES Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 9.2.2, Drainage Maintenance of Infrastructure, 9.3.1, Tunnels Maintenance of Infrastructure, 9.3.2, Bridges and Aerial Structures Maintenance of Infrastructure, 9.3.3, Depressed Structures
	2.3 Safety	
	2.3.1 Interfaces with Guideway (excl. Trackwork)	
	2.3.1.1 General	
IF 5910	2.3.1.1.1 Interface between O&M SAF Non-	



ID	Interface	Document Reference(s)
	Combustible Material Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M SAF non-combustible material requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.3.1, Fire and/or smoke on at-grade alignment Certifiable Elements and Hazards Log, 1.1.3.2, Wayside fire and/or smoke adjacent to an at-grade alignment Certifiable Elements and Hazards Log, 1.2.1.7, Fire on elevated structure Certifiable Elements and Hazards Log, 1.2.1.8, Fire/smoke from adjacent R-O-W structures or wildfires adjacent the R-O-W Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel Certifiable Elements and Hazards Log, 1.2.3.2, Fire in below-grade structure. DCM, 12.4.1, Structural Design Parameters DCM, 13.7, Fire Protection
IF 5932	2.3.1.1.2 Interface between O&M SAF High-Wind Barrier Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M SAF high-wind barrier requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.7, High Winds DCM, 12.3, Types of Structures DCM, 12.5.1.1, Dead Load (DC, DW) DCM, 12.5.2.6, Wind Loads (WS, WL) DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-002, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-020, AERIAL STRUCTURE, SOUND WALL CONFIGURATION Drawing DD-ST-021, EMBANKMENT, SOUND WALL CONFIGURATION
	2.3.1.2 Reliability & Availability	
IF 5918	2.3.1.2.1 Interface between O&M SAF Reliability & Availability Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M SAF reliability and availability requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.2.1.1, Collapse - Fatigue Certifiable Elements and Hazards Log, 1.2.4.5, Overhead structures collapse onto R-O-W due to fatigue. DCM, 1.4.6, Design Life DCM, 1.5, Durability



ID	Interface	Document Reference(s)
		DCM, 12.4.1, Structural Design Parameters
	2.3.1.3 Clearances	
IF 5930	2.3.1.3.1 Interface between O&M SAF Clearance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety clearance requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.8, Snow and Ice Certifiable Elements and Hazards Log, 1.1.2.1, Collision between HSR trains Certifiable Elements and Hazards Log, 1.1.2.13, Adjacent trees or other vegetation enters operating envelope during high winds or storm event Certifiable Elements and Hazards Log, 1.1.4.10, Structures adjacent the ROW collapse onto the ROW Certifiable Elements and Hazards Log, 1.1.4.12, Adjacent wind turbine suffers rotor failure or structural collapse, with resulting intrusion of debris into the ROW. Certifiable Elements and Hazards Log, 1.1.4.3, Passing HSR trains affect each other Certifiable Elements and Hazards Log, 1.2.1.5, Collapse - Struck by highway/oversize vehicle Certifiable Elements and Hazards Log, 1.2.2.3, Train derailment and impact with tunnel wall Certifiable Elements and Hazards Log, 1.2.2.4, Train derailment and impact with tunnel portal face Certifiable Elements and Hazards Log, 1.2.3.3, Impact wall of structure. DCM, 13.16.2, Noise Mitigation Hood DCM, 13.3.11, Rolling Stock DCM, 13.3.5, Clearances DCM, 13.4.1, Sonic Booms at Tunnel Portals DCM, 3.3.2, Horizontal Clearances DCM, 3.5, Track Center Spacing DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 7.7.2.3, Clearances DCM, 7.7.2.3.1, Authority Roadways DCM, 7.8, Access Control Devices DCM, 7.8.1.1.4, Vegetation Control along Fences



ID	Interface	Document Reference(s)
		Drawing DD-CV-010, MINIMUM CLEARANCE, GRADE SEPARATED STRUCTURES Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-402, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, LONG SECTION Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-405, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, LONG SECTION Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-408, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, LONG SECTION
	2.3.1.4 Emergency Egress & Access	
IF 3872	2.3.1.4.1 Interface between O&M SAF Emergency Walkway Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety emergency walkway spatial requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.5.1, Evacuation from at-grade alignment Certifiable Elements and Hazards Log, 1.2.1.11, Evacuation required. Certifiable Elements and Hazards Log, 1.2.1.7, Fire on elevated structure Certifiable Elements and Hazards Log, 1.2.2.3, Train derailment and impact with tunnel wall Certifiable Elements and Hazards Log, 1.2.2.5, Evacuation from tunnel structure Certifiable Elements and Hazards Log, 1.2.3.3, Impact wall of structure. Certifiable Elements and Hazards Log, 1.2.3.4, Evacuation required. Certifiable Elements and Hazards Log, 1.2.4.7, Evacuation from retained fill or raised embankment trainway DCM, 1.3.1.2, Federal and National Regulations and Codes DCM, 1.3.1.2, Federal and National Regulations and Codes DCM, 12.11.2.9, Miscellaneous Loads DCM, 12.14.1, Cable Trough DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls DCM, 13.15.5, Design Requirements for Cable Troughs DCM, 13.16.11, Paved Emergency Egress from Tunnels



ID	Interface	Document Reference(s)
		<p>DCM, 13.17.2, Several Short Tunnels Close Together</p> <p>DCM, 13.17.3, Shorter Tunnel with Constrained Access</p> <p>DCM, 13.17.5, Longer Tunnel with Constrained Portal Access</p> <p>DCM, 13.2, Regulations, Codes, Standards, and Guidelines</p> <p>DCM, 13.3.6, Walkways</p> <p>DCM, 3.2, Regulations, Codes, Standards, and Guidelines</p> <p>DCM, 3.4, Vehicle Clearance Envelopes</p> <p>DCM, 3.4.4, Effects of Superelevation</p> <p>DCM, 3.5, Track Center Spacing</p> <p>DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section</p> <p>DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels</p> <p>DCM, 7.7.10, Cross-Walks</p> <p>DCM, 7.7.7, Walkways and Cable Trough</p> <p>Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>Drawing DD-CV-002, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, OPEN CUT</p> <p>Drawing DD-CV-003, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL</p> <p>Drawing DD-CV-004, TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT</p> <p>Drawing DD-CV-005, TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT</p> <p>Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p>Drawing DD-ST-002, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p>Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE</p> <p>Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE</p> <p>Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p>Drawing DD-ST-011, TYPICAL CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL</p> <p>Drawing DD-ST-012, CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL</p>



ID	Interface	Document Reference(s)
		<p>STRUCTURE / AT-FRADE / CUT & COVER TUNNEL</p> <p>Drawing DD-ST-013, TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>Drawing DD-ST-017, TYPICAL CROSS SECTION, AERIAL STRUCTURE, FOUR TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER</p> <p>Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY</p> <p>Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH</p> <p>Drawing DD-TN-102, TYPICAL CROSS SECTION, DOUBLE TRACK MINED TUNNEL, WITH SEPARATION WALL</p> <p>Drawing DD-TN-103, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITH SEPARATION WALL</p> <p>Drawing DD-TN-104, TYPICAL CROSS SECTION , TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-105, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-111, TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT</p> <p>Drawing DD-TN-112, TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT</p> <p>Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS</p> <p>Drawing DD-TN-200, BASIC TUNNEL CONFIGURATION, SINGLE TRACK TWIN TBM BORED TUNNEL, DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-201, BASIC TUNNEL CONFIGURATION SINGLE TRACK TWIN TBM BORED TUNNEL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-203, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-204, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL, DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-205, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-206, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-207, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL</p> <p>Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED</p>



ID	Interface	Document Reference(s)
		EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
IF 3470	2.3.1.4.2 Interface between O&M SAF Emergency Walkway Floor Live Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety emergency walkway live load requirements have been addressed by the INF team.	DCM, 12.11.2.9, Miscellaneous Loads DCM, 12.11.2.9.1, Cut-and-Cover Walkway Cover Live Loads DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 12.7.1.4, Floor Load DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls DCM, 7.7.7, Walkways and Cable Trough
IF 3927	2.3.1.4.3 Interface between O&M SAF Emergency Walkway Fall Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety emergency walkway handrail/safety barrier requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.2.1.10, Person falls from elevated structure. Certifiable Elements and Hazards Log, 1.2.3.7, Person falls into below-grade structure Certifiable Elements and Hazards Log, 1.2.4.2, Exposed precipices at culverts, retaining walls, and other raised structures DCM, 12.10, Earth Retaining Structures DCM, 12.7.1.6, Miscellaneous Loads DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls DCM, 13.3.5, Clearances DCM, 13.3.6, Walkways DCM, 7.8.2.7, Trackway on Retained Fill DCM, 7.8.2.8, Trackway on Retained Cut (Open) Drawing DD-CV-003, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-CV-009, FENCE AT CULVERT CROSSINGS



ID	Interface	Document Reference(s)
		Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-002, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE Drawing DD-ST-005, AERIAL STRUCTURE, CONCRETE PARAPET Drawing DD-ST-007, AERIAL STRUCTURE,TYPICAL SPAN, EXPANSION JOINT DETAILS Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY Drawing DD-ST-017, TYPICAL CROSS SECTION, AERIAL STRUCTURE, FOUR TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH
IF 3932	2.3.1.4.4 Interface between O&M SAF Egress/Access Stairway Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety egress/access stairway spatial requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.5.1, Evacuation from at-grade alignment Certifiable Elements and Hazards Log, 1.2.1.11, Evacuation required. Certifiable Elements and Hazards Log, 1.2.1.7, Fire on elevated structure Certifiable Elements and Hazards Log, 1.2.4.7, Evacuation from retained fill or raised embankment trainway DCM, 1.3.1.2, Federal and National Regulations and Codes DCM, 12.10.8, Trench Emergency Exits DCM, 12.14.7, Access Stairs DCM, 12.8.8, Emergency Access DCM, 7.7.11, Emergency Stairs DCM, 7.8.1.5, Gates DCM, 7.8.2.6, Trackway on Aerial Structure DCM, 7.8.2.7, Trackway on Retained Fill Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-ST-008, AERIAL STRUCTURE, BRIDGE EMERGENCY EXIT STAIRWAY DETAILS 1 Drawing DD-ST-009, AERIAL STRUCTURE, BRIDGE EMERGENCY EXIT STAIRWAY



ID	Interface	Document Reference(s)
		DETAILS 2
IF 3799	2.3.1.4.5 Interface between O&M SAF Access/Egress Stairway Live Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety egress/access stairway live load requirements have been addressed by the INF team.	DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 12.7.1.4, Floor Load
IF 5902	2.3.1.4.6 Interface between O&M SAF Egress & Access Point, Assembly Area & Emergency Facility Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety egress & access point, assembly area & emergency facility requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.5.1, Evacuation from at-grade alignment Certifiable Elements and Hazards Log, 1.2.1.11, Evacuation required. Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel Certifiable Elements and Hazards Log, 1.2.2.5, Evacuation from tunnel structure Certifiable Elements and Hazards Log, 1.2.3.2, Fire in below-grade structure. Certifiable Elements and Hazards Log, 1.2.3.4, Evacuation required. Certifiable Elements and Hazards Log, 1.2.4.7, Evacuation from retained fill or raised embankment trainway DCM, 12.10.8, Trench Emergency Exits DCM, 12.11.3.2, Cut-and-Cover Underground Trackway Structures DCM, 12.14.7, Access Stairs DCM, 13.16.10, Cross Track Emergency Vehicle Access DCM, 13.16.11, Paved Emergency Egress from Tunnels DCM, 13.16.12, Train Surface Evacuation and Fire Control Zone DCM, 13.16.6, Emergency Vehicle Assembly and Turnaround Area DCM, 13.16.7, Rescue Area/Passenger Assembly Area DCM, 13.3.8, Escape Shafts and Escape Tunnels DCM, 13.3.9, Crosspassages DCM, 7.7.1.1, Access Roads Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN



ID	Interface	Document Reference(s)
		Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN
IF 3937	2.3.1.4.7 Interface between O&M SAF Access/Egress Roadway Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety egress/access roadway requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.5.1, Evacuation from at-grade alignment Certifiable Elements and Hazards Log, 1.2.1.11, Evacuation required. Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel Certifiable Elements and Hazards Log, 1.2.2.5, Evacuation from tunnel structure Certifiable Elements and Hazards Log, 1.2.3.2, Fire in below-grade structure. Certifiable Elements and Hazards Log, 1.2.3.4, Evacuation required. Certifiable Elements and Hazards Log, 1.2.4.7, Evacuation from retained fill or raised embankment trainway DCM, 12.10.8, Trench Emergency Exits DCM, 13.16.5, Access Road DCM, 7.7.1.1, Access Roads DCM, 7.7.1.2, Service Roads DCM, 7.8.1.5, Gates DCM, 7.8.2.6, Trackway on Aerial Structure DCM, 7.8.2.7, Trackway on Retained Fill Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-401, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-404, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, FRONT ELEVATION Drawing DD-TN-405, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, LONG SECTION Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN



ID	Interface	Document Reference(s)
	2.3.1.5 Intrusion Protection	
IF 1069	2.3.1.5.1 Interface between O&M SAF Adjacent Railroad Intrusion Protection Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the O&M safety adjacent railroad intrusion protection requirements (prevention of adjacent railroads from entering the HST corridor) have been addressed by the INF team.</p>	<p>Certifiable Elements and Hazards Log, 1.1.2.2, Non-HSR train enters HSR trackway from adjacent exclusive corridor. Certifiable Elements and Hazards Log, 1.1.5.2, Dense ground fog impairs visibility Certifiable Elements and Hazards Log, 1.2.1.4, Collapse - Struck by non-HSR train DCM, 1.2.1, Infrastructure DCM, 12.10, Earth Retaining Structures DCM, 12.10.4, Trenches DCM, 12.10.5, Trench Intrusion Protection DCM, 12.10.5.2, Railroad Intrusion DCM, 12.5.2.14, Collision Loads (CL) DCM, 12.5.2.14, Collision Loads (CL) DCM, 12.8.1.1, Type Selection DCM, 12.8.6.3, Intrusion Protection DCM, 12.8.6.3.2, Railroad Intrusion DCM, 12.9.3, Intrusion Protection DCM, 3.3.2, Horizontal Clearances DCM, 6.1, Scope DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 6.3.1, Protection Against Intrusion of Conventional Trains DCM, 6.3.1.1, Protection Measures without Physical Barriers DCM, 6.3.1.2, Protection Measures with Physical Barriers DCM, 6.4, Containment of HST Rolling Stock DCM, 7.8.2.3, At-Grade Trackway Adjacent to Conventional Railroad DCM, 7.8.2.9, Trackway Underground (Bored, Mined, and Cut-and-Cover Tunnels) Drawing DD-IP-001, EARTHWORK BERM, RAILROAD ADJACENT TO HST Drawing DD-IP-002, BARRIERS IN SHARED CORRIDOR Drawing DD-IP-003, HST PIER PROTECTION, IN RAILROAD RIGHT OF WAY Drawing DD-IP-004, IN SHARED AND ADJACENT CORRIDOR, AT-GRADE Drawing DD-IP-005, AT-GRADE BERM OR DITCH ON HST GUIDEWAY,</p>



ID	Interface	Document Reference(s)
		RAILROAD ADJACENT TO HST
IF 1070	2.3.1.5.2 Interface between O&M SAF Adjacent Roadway Intrusion Protection Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the O&M safety adjacent roadway intrusion protection requirements (prevention of adjacent roadways from entering the HST corridor) have been addressed by the INF team.</p>	<p>Certifiable Elements and Hazards Log, 1.1.2.5, Highway vehicle enters the HSR trackway from an adjacent roadway Certifiable Elements and Hazards Log, 1.1.5.2, Dense ground fog impairs visibility Certifiable Elements and Hazards Log, 1.2.1.5, Collapse - Struck by highway/oversize vehicle DCM, 1.2.1, Infrastructure DCM, 12.10, Earth Retaining Structures DCM, 12.10.4, Trenches DCM, 12.10.5, Trench Intrusion Protection DCM, 12.10.5.1, Highway Traffic Intrusion DCM, 12.8.1.1, Type Selection DCM, 12.8.6.3, Intrusion Protection DCM, 12.8.6.3.1, Highway Traffic Intrusion DCM, 12.9.3, Intrusion Protection DCM, 3.3.2, Horizontal Clearances DCM, 6.1, Scope DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 6.3.2, Protection Against Intrusion of Highway Vehicles DCM, 6.3.2.1, Protection Against Intrusion of Roadway Vehicles into the HST Operating Infrastructure DCM, 6.3.2.3, HST Pier and Wall Protection DCM, 7.8.1.2, Walls DCM, 7.8.1.3, Traffic Barriers DCM, 7.8.2.2, At-Grade Trackway within Highway Corridor DCM, 7.8.2.9, Trackway Underground (Bored, Mined, and Cut-and-Cover Tunnels) DCM, 7.8.4.3, Streets Ending at HST Trackway DCM, 7.8.4.4, Authority Roadways DCM, 7.8.4.6, Drainage Structures Drawing DD-IP-006, HST PIER PROTECTION, IN HIGHWAY/ROADWAY RIGHT OF WAY</p>



ID	Interface	Document Reference(s)
		Drawing DD-IP-007, HST TRENCH AND RETAINING WALL PROTECTION Drawing DD-IP-008, ADJACENT TO HIGHWAY/ROADWAY
IF 5904	2.3.1.5.3 Interface between O&M SAF Overpass Roadway Intrusion Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety overpass roadway intrusion protection requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.2.4, Highway vehicle enters the HSR trackway from an overpass Certifiable Elements and Hazards Log, 1.1.5.2, Dense ground fog impairs visibility DCM, 1.2.1, Infrastructure DCM, 12.5.2.14, Collision Loads (CL) DCM, 12.5.2.14.4, Highway Vehicle Collision Loads (LLH) DCM, 6.1, Scope DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 6.3.2.2, Protection Against Intrusion of Roadway Vehicles over the HST Operating Infrastructure DCM, 7.8.1.3, Traffic Barriers DCM, 7.8.4.2, Roadway Overpasses Crossing HST Trackway DCM, 7.8.4.6, Drainage Structures Drawing DD-CV-008, FENCING ON GRADE SEPARATED STRUCTURES
IF 5905	2.3.1.5.4 Interface between O&M SAF Overpass Thrown Objects Intrusion Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety overpass thrown objects intrusion protection requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.2.7, Object thrown from overpass DCM, 1.2.1, Infrastructure DCM, 14.4.2.3, Pedestrians DCM, 14.4.2.3.3, Pedestrian Bridges and Underpasses DCM, 6.1, Scope DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 6.3.2.2, Protection Against Intrusion of Roadway Vehicles over the HST Operating Infrastructure DCM, 7.8.4.2, Roadway Overpasses Crossing HST Trackway DCM, 7.8.4.6, Drainage Structures Drawing DD-CV-008, FENCING ON GRADE SEPARATED STRUCTURES
	2.3.1.6 Access Control	
IF 901	2.3.1.6.1 Interface between O&M SAF	



ID	Interface	Document Reference(s)
	Pedestrian/Wildlife Access Control Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the GWY pedestrian/wildlife access control requirements (prevention of pedestrians/wildlife from entering the HST corridor) have been addressed by the INF team.</p>	<p>Certifiable Elements and Hazards Log, 1.1.2.10, Trespasser Certifiable Elements and Hazards Log, 1.1.2.11, Livestock Certifiable Elements and Hazards Log, 1.1.5.2, Dense ground fog impairs visibility Certifiable Elements and Hazards Log, 1.2.4.3, Person enters confined space / culvert DCM, 1.2.1, Infrastructure DCM, 1.2.8, Safety and Reliability DCM, 7.8.1, Access Control Devices DCM, 7.8.1.1, Fences DCM, 7.8.1.1.1, Access Restriction Fencing DCM, 7.8.1.1.2, Access Detering Fencing DCM, 7.8.1.4, Fencing and Traffic Barriers in combination DCM, 7.8.1.5, Gates DCM, 7.8.1.5.2, Walking Gates DCM, 7.8.1.5.3, Driving Gates DCM, 7.8.1.6, Fence Signage DCM, 7.8.2, Access Control by Type of HST Trackway DCM, 7.8.2.1, At-Grade Trackway DCM, 7.8.2.2, At-Grade Trackway within Highway Corridor DCM, 7.8.2.4, At-Grade Trackway through High-Risk Trespassing Areas DCM, 7.8.2.5, Trackway in Cut or Fill (Embankment) Section DCM, 7.8.2.6, Trackway on Aerial Structure DCM, 7.8.2.7, Trackway on Retained Fill DCM, 7.8.2.8, Trackway on Retained Cut (Open) DCM, 7.8.2.9, Trackway Underground (Bored, Mined, and Cut-and-Cover Tunnels) DCM, 7.8.4.2, Roadway Overpasses Crossing HST Trackway DCM, 7.8.4.5, Emergency Exits and Equipment Rooms in Tunnels DCM, 7.8.4.6, Drainage Structures DCM, 7.9, Wildlife Crossing DCM, 8.5.1.3, Access Control Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT Drawing DD-CV-002, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED,</p>



ID	Interface	Document Reference(s)
		OPEN CUT Drawing DD-CV-003, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL Drawing DD-CV-004, TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT Drawing DD-CV-005, TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-CV-008, FENCING ON GRADE SEPARATED STRUCTURES Drawing DD-CV-009, FENCE AT CULVERT CROSSINGS Drawing DD-IP-001, EARTHWORK BERM, RAILROAD ADJACENT TO HST Drawing DD-IP-002, BARRIERS IN SHARED CORRIDOR Drawing DD-IP-004, IN SHARED AND ADJACENT CORRIDOR, AT-GRADE Drawing DD-IP-005, AT-GRADE BERM OR DITCH ON HST GUIDEWAY, RAILROAD ADJACENT TO HST Drawing DD-IP-007, HST TRENCH AND RETAINING WALL PROTECTION Drawing DD-IP-008, ADJACENT TO HIGHWAY/ROADWAY Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN
	2.3.1.7 Grade Crossings	
IF 5900	2.3.1.7.1 Interface between O&M SAF Grade Crossing Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety grade crossing requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.2.3, Collision with a highway vehicle at an at-grade crossing Certifiable Elements and Hazards Log, 1.1.5.2, Dense ground fog impairs



ID	Interface	Document Reference(s)
		visibility DCM, 1.2.1, Infrastructure DCM, 1.2.8, Safety and Reliability DCM, 7.6.1, Roadways DCM, 7.8.2.1, At-Grade Trackway
	2.3.1.8 Drainage	
IF 5909	2.3.1.8.1 Interface between O&M SAF Hydrologic Analysis Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety hydrologic analysis requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.4, Washout Certifiable Elements and Hazards Log, 1.1.1.5, Slide Certifiable Elements and Hazards Log, 1.1.2.12, Flooding, standing water Certifiable Elements and Hazards Log, 1.2.1.6, Collapse - Washout/Erosion Certifiable Elements and Hazards Log, 1.2.3.5, Flooding caused by rain/stormwater runoff DCM, 1.1.1, Purpose and Extent DCM, 1.9.3, Rainfall DCM, 10.8, Embankments for HST Trackway DCM, 12.11.2.7, Hydrostatic Pressure (Buoyancy) DCM, 12.11.2.8, Flotation DCM, 8.1, Scope DCM, 8.4, Hydrological Analysis DCM, 8.4.1, Time of Concentration DCM, 8.4.2, Intensity DCM, 8.4.3, Design Storm Frequency/Recurrence Interval DCM, 8.4.4, Snowmelt DCM, 8.4.5, Storm Runoff DCM, 8.4.6, Floodplain Information DCM, 8.5.2.6, Pump Stations DCM, 8.9, Application of Approved Software
IF 5908	2.3.1.8.2 Interface between O&M SAF Flood Prevention & Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety flood prevention & protection requirements have been addressed by the INF	Certifiable Elements and Hazards Log, 1.1.1.4, Washout Certifiable Elements and Hazards Log, 1.1.1.5, Slide Certifiable Elements and Hazards Log, 1.1.2.12, Flooding, standing water



ID	Interface	Document Reference(s)
	team.	<p>Certifiable Elements and Hazards Log, 1.2.3.5, Flooding caused by rain/stormwater runoff</p> <p>DCM, 10.8.5.2, Embankments in Wet Conditions</p> <p>DCM, 10.8.5.3, Embankment in Flood Plains</p> <p>DCM, 12.10.4, Trenches</p> <p>DCM, 8.3, Policies</p> <p>DCM, 8.4.6, Floodplain Information</p> <p>DCM, 8.5.3.3, Inlet Structure</p> <p>DCM, 8.6.6, Trenches</p> <p>Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p>Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY</p> <p>Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH</p> <p>Drawing DD-TN-100, TYPICAL CROSS SECTION, SINGLE TRACK BORED (TBM/CIRCULAR) TUNNEL</p> <p>Drawing DD-TN-101, TYPICAL CROSS SECTION, SINGLE TRACK MINED TUNNEL (DRAINED)</p> <p>Drawing DD-TN-102, TYPICAL CROSS SECTION, DOUBLE TRACK MINED TUNNEL, WITH SEPARATION WALL</p> <p>Drawing DD-TN-103, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITH SEPARATION WALL</p> <p>Drawing DD-TN-104, TYPICAL CROSS SECTION , TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-105, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-106, TYPICAL SHAFT ARRANGEMENT - TWIN TRACK SINGLE BORE TUNNEL WITHOUT SEPARATION WALL - SECTION</p> <p>Drawing DD-TN-107, TYPICAL SHAFT ARRANGEMENT - TWIN TRACK SINGLE BORE TUNNEL WITHOUT SEPARATION WALL - PLAN</p> <p>Drawing DD-TN-108, TYPICAL RESCUE TUNNEL ARRANGEMENT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-109, TYPICAL MINED CROSS PASSAGE, WITH OPTIONAL SUMP, SINGLE TRACK TWIN BORED TUNNEL</p> <p>Drawing DD-TN-110, TYPICAL SUMP ENLARGEMENT IN RUNNING TUNNEL, SINGLE TRACK TWIN BORED TUNNEL</p> <p>Drawing DD-TN-111, TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT</p>



ID	Interface	Document Reference(s)
		Drawing DD-TN-112, TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
IF 6165	2.3.1.8.3 Interface between O&M SAF Drainage System Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety drainage system requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.3, Roadbed Failure Certifiable Elements and Hazards Log, 1.1.1.4, Washout Certifiable Elements and Hazards Log, 1.2.1.6, Collapse - Washout/Erosion Certifiable Elements and Hazards Log, 1.2.3.5, Flooding caused by rain/stormwater runoff CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL DCM, 10.8.5.8, Drainage DCM, 10.9.2, Drainage and Surface Erosion Control DCM, 12.10.7, Trench Drainage DCM, 12.14.3, Drainage DCM, 12.8.1.3, Water Crossings DCM, 12.8.6.7, Drainage DCM, 13.16.18, Surface Drainage DCM, 13.16.19, Tunnel Seepage and Wash Water DCM, 13.16.20, Detention Pond DCM, 7.3, Grading, Side Slopes, and Retaining Walls for Roadway and Site Embankments DCM, 8.3, Policies DCM, 8.5.2.1, Open Channel Hydraulics



ID	Interface	Document Reference(s)
		DCM, 8.5.2.3, Underdrain System DCM, 8.6.2, Embankments and Cut Slopes DCM, 8.6.3, Bridges/Aerial Structures DCM, 8.6.3.1, Freeboard Protection DCM, 8.6.3.2, Erosion Control and Scour Protection DCM, 8.6.3.3, Pier Design and Location DCM, 8.6.3.4, Deck Drainage System DCM, 8.6.4, Tunnels DCM, 8.6.5, Retaining Walls DCM, 8.6.6, Trenches Drawing DD-CD-001, NON-BALLASTED AERIAL STRUCTURE, BRIDGE DECK DRAINAGE SYSTEM Drawing DD-CD-002, AERIAL STRUCTURE, BEGIN AND END BRIDGE DRAINAGE SYSTEM Drawing DD-CD-003, AT-GRADE TRACK, DRAINAGE SYSTEM Drawing DD-CD-004, AT-GRADE STATION PLATFORM, DRAINAGE SYSTEM Drawing DD-CD-005, AERIAL STRUCTURE - BRIDGE DECK, DRAINAGE INLET DETAIL Drawing DD-CD-006, ELEVATED STATION PLATFORM, DRAINAGE SYSTEM Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT Drawing DD-CV-002, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, OPEN CUT Drawing DD-CV-003, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL Drawing DD-CV-004, TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT Drawing DD-CV-005, TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-002, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE Drawing DD-ST-007, AERIAL STRUCTURE,TYPICAL SPAN, EXPANSION JOINT



ID	Interface	Document Reference(s)
		<p>DETAILS</p> <p>Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p>Drawing DD-ST-011, TYPICAL CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL</p> <p>Drawing DD-ST-013, TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>Drawing DD-ST-014, RETAINING WALL, LAYOUT AND DETAILS</p> <p>Drawing DD-ST-015, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER</p> <p>Drawing DD-ST-016, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER</p> <p>Drawing DD-ST-017, TYPICAL CROSS SECTION, AERIAL STRUCTURE, FOUR TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER</p> <p>Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY</p> <p>Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH</p> <p>Drawing DD-ST-021, EMBANKMENT, SOUND WALL CONFIGURATION</p> <p>Drawing DD-TN-100, TYPICAL CROSS SECTION, SINGLE TRACK BORED (TBM/CIRCULAR) TUNNEL</p> <p>Drawing DD-TN-101, TYPICAL CROSS SECTION, SINGLE TRACK MINED TUNNEL (DRAINED)</p> <p>Drawing DD-TN-102, TYPICAL CROSS SECTION, DOUBLE TRACK MINED TUNNEL, WITH SEPARATION WALL</p> <p>Drawing DD-TN-103, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITH SEPARATION WALL</p> <p>Drawing DD-TN-104, TYPICAL CROSS SECTION , TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-105, TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-106, TYPICAL SHAFT ARRANGEMENT - TWIN TRACK SINGLE BORE TUNNEL WITHOUT SEPARATION WALL - SECTION</p> <p>Drawing DD-TN-107, TYPICAL SHAFT ARRANGEMENT - TWIN TRACK SINGLE BORE TUNNEL WITHOUT SEPARATION WALL - PLAN</p> <p>Drawing DD-TN-108, TYPICAL RESCUE TUNNEL ARRANGEMENT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-109, TYPICAL MINED CROSS PASSAGE, WITH OPTIONAL SUMP, SINGLE TRACK TWIN BORED TUNNEL</p>



ID	Interface	Document Reference(s)
		Drawing DD-TN-110, TYPICAL SUMP ENLARGEMENT IN RUNNING TUNNEL, SINGLE TRACK TWIN BORED TUNNEL Drawing DD-TN-111, TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT Drawing DD-TN-112, TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN TUNNEL
IF 5931	2.3.1.8.4 Interface between O&M SAF Landfill Gas Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety landfill gas requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.4.11, Solid-waste landfill adjacent the ROW emits hazardous amounts of Landfill Gas (LFG). DCM, 10.5.2, Geotechnical Engineering Design Report (GEDR) DCM, 13.14.4, Gases Dissolved in Groundwater DCM, 13.14.6, Gassy Ground DCM, 13.15.2, Warning Systems and Location Cases DCM, 13.15.4, Facility Services and Infrastructure
IF 5933	2.3.1.8.5 Interface between O&M SAF Hazardous Gas Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety hazardous gas	Certifiable Elements and Hazards Log, 1.2.2.6, Seepage of hazardous gas from ground, hazmat spill during maintenance activities inside tunnel



ID	Interface	Document Reference(s)
	requirements have been addressed by the INF team.	DCM, 12.11.3, Waterproofing of Underground Structures DCM, 12.11.3.2, Cut-and-Cover Underground Trackway Structures DCM, 12.11.3.2.1, Cut-and-Cover Box DCM, 13.12.2, Waterproofing Measures DCM, 13.12.3, Junction between New and Existing Structures DCM, 13.14.4, Gases Dissolved in Groundwater DCM, 13.14.6, Gassy Ground DCM, 13.15.2, Warning Systems and Location Cases DCM, 13.15.4, Facility Services and Infrastructure
	2.3.1.9 Utilities	
IF 5924	2.3.1.9.1 Interface between O&M SAF High-Risk Adjacent/Underground Utility Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety high-risk adjacent/underground utility requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.4.4, Leak or rupture in hazmat pipeline crossing under or adjacent HSR trackway. Certifiable Elements and Hazards Log, 1.1.4.9, Underground utilities struck during construction / maintenance activities DCM, 12.14.10, Utilities DCM, 13.16.25, Public Utilities DCM, 9.2, Regulations, Codes, Standards, and Guidelines DCM, 9.5.1, High Risk and Low Risk Utilities DCM, 9.5.2, Right-of-Way Encroachment DCM, 9.5.4.3, Positive Location of Underground Utilities DCM, 9.5.4.7, Casings DCM, 9.5.5, Utility Clearances
IF 5925	2.3.1.9.2 Interface between O&M SAF Low-Risk Adjacent/Underground Utility Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety low-risk adjacent/underground utility requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.4.5, Leak or rupture in non-hazmat pipeline crossing under or adjacent HSR trackway. Certifiable Elements and Hazards Log, 1.1.4.9, Underground utilities struck during construction / maintenance activities Certifiable Elements and Hazards Log, 1.2.3.6, Flooding caused by breach in overhead canal DCM, 12.14.10, Utilities DCM, 13.16.25, Public Utilities



ID	Interface	Document Reference(s)
		DCM, 9.2, Regulations, Codes, Standards, and Guidelines DCM, 9.5.1, High Risk and Low Risk Utilities DCM, 9.5.2, Right-of-Way Encroachment DCM, 9.5.4.3, Positive Location of Underground Utilities DCM, 9.5.4.7, Casings DCM, 9.5.5, Utility Clearances
IF 5926	2.3.1.9.3 Interface between O&M SAF Overhead Utility Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety overhead utility requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.4.7, Overhead high voltage lines collapse onto ROW, or are struck during construction / maintenance activities Certifiable Elements and Hazards Log, 1.1.4.8, Other overhead utility lines (telephone, cable, etc) collapse onto ROW, or are struck during construction / maintenance activities DCM, 9.2, Regulations, Codes, Standards, and Guidelines DCM, 9.5.3.2, Transverse Encroachments DCM, 9.5.5.7, Overhead Utilities DCM, 21.2, Regulations, Codes, Standards, and Guidelines DCM, 9.5.5.7, Overhead Utilities DCM, 9.5.5.8, Aboveground Utility Facilities DCM, 21.14.7, Clearances for Utility Lines Crossing over the Electrified Railroad
IF 1201	2.3.1.9.4 Interface between O&M SAF Seismic Event Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety seismic event requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.6, Seismic Activity Certifiable Elements and Hazards Log, 1.2.1.3, Collapse - Seismic activity Certifiable Elements and Hazards Log, 1.2.2.1, Seismic activity Certifiable Elements and Hazards Log, 1.2.3.1, Seismic activity Certifiable Elements and Hazards Log, 1.2.4.4, Overhead structures collapse onto R-O-W due to seismic activity. Certifiable Elements and Hazards Log, 1.2.4.6, Retaining wall - collapse due to seismic activity DCM, 10.12, Seismic Design DCM, 10.12.1, Design Earthquakes DCM, 10.12.2, Liquefaction of Foundation Soils DCM, 10.12.4, Underground Structures



ID	Interface	Document Reference(s)
		DCM, 10.12.7, Cut-and-Cover Structures DCM, 10.12.8, Design of Foundations for Bridges and Aerial Trackways DCM, 10.4, Subsurface Investigation and Data Analysis DCM, 10.5.1, Geotechnical Data Report (GDR) DCM, 10.5.2, Geotechnical Engineering Design Report (GEDR) DCM, 10.7.3, Stability of Retaining Walls DCM, 10.7.6, Settlements and Horizontal Deformations DCM, 10.8.5.5, Embankments on Potentially Liquefiable Soils/Compressible Soils DCM, 10.9.1, Design of Cut Slopes DCM, 11.1, Scope DCM, 11.2, Regulations, Codes, Standards, and Guidelines DCM, 11.3, Seismic Analysis and Design Plan DCM, 11.4.1.1, General Classifications DCM, 11.4.1.2, Importance Classification DCM, 11.4.1.3, Technical Classification DCM, 11.5, Seismic Design Policy DCM, 11.5.1, Seismic Performance Criteria DCM, 11.5.2, Design Earthquakes DCM, 11.5.2, Design Earthquakes DCM, 11.7, Bridges and Aerial Structures DCM, 11.7.2.1, Maximum Considered Earthquake Design Philosophy DCM, 11.7.3, Seismic Demands on Structural Components DCM, 11.7.4.6, Strain Limits for Ductile Reinforced Concrete Caissons, Piles, and Drilled Shafts DCM, 11.7.6.3, Design of Shallow Foundations DCM, 11.7.6.4, Design of Caisson, Pile, and Drilled Shaft Foundations DCM, 11.7.6.5, Battered Piles DCM, 11.7.6.6, Expansion Joint and Hinge / Seat Capacity DCM, 11.8, Tunnels and Underground Structures DCM, 11.8.1, Design Codes DCM, 11.8.2, Seismic Design Philosophy DCM, 12.4.2, Seismic Design DCM, 12.5.2.10, Seismic Loads (MCE, OBE) DCM, 12.6.4.1, Track Serviceability Load Cases DCM, 12.6.7, Passenger Comfort Analysis DCM, 13.8.4, Seismic Load Considerations



ID	Interface	Document Reference(s)
		DCM, 13.9.4, Seismic Analysis
IF 263	2.3.1.9.5 Interface between O&M SAF Fault Zone Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety fault zone requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.6, Seismic Activity DCM, 12.4.2, Seismic Design DCM, 13.14.8, Fault Zones DCM, 10.4, Subsurface Investigation and Data Analysis DCM, 10.5.1, Geotechnical Data Report (GDR) DCM, 10.8.5.4, Embankments over Active Fault Locations DCM, 10.9.1, Design of Cut Slopes DCM, 10.13, Structures over/near Active Faults and Mitigation DCM, 11.4.1.3, Technical Classification DCM, 11.5.2, Design Earthquakes DCM, 11.5.3, Hazardous Fault Crossings DCM, 11.10, Fault Displacement Analysis and Mitigation Guidelines DCM, 3.6.3, Additional Clearance for Seismic Fault Zones
	2.3.1.10 Loads	
IF 5922	2.3.1.10.1 Interface between O&M SAF Load & Pressure Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety load & pressure requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.3, Roadbed Failure Certifiable Elements and Hazards Log, 1.1.1.5, Slide Certifiable Elements and Hazards Log, 1.2.1.12, Collapse - Unsupported foundation or ground movement Certifiable Elements and Hazards Log, 1.2.1.2, Collapse - Exceed capacity of structure Certifiable Elements and Hazards Log, 1.2.2.9, Collapse due to inward pressure exceeding the capacity of the tunnel structure Certifiable Elements and Hazards Log, 1.2.3.8, Collapse - Inward pressure exceeds the capacity of the trench structure Certifiable Elements and Hazards Log, 1.2.4.1, Raised Embankments - Sliding / Collapse DCM, 10.4, Subsurface Investigation and Data Analysis DCM, 10.5.1, Geotechnical Data Report (GDR) DCM, 10.5.2, Geotechnical Engineering Design Report (GEDR) DCM, 10.6, Aerial Structure / Bridge Foundations and Stations / Miscellaneous



ID	Interface	Document Reference(s)
		Structures DCM, 10.8, Embankments for HST Trackway DCM, 10.8.1, Slope Inclination DCM, 10.9.1, Design of Cut Slopes DCM, 10.9.1.1, Design Requirements DCM, 10.9.3, Slope Stability Mitigation Methods for Cut Slopes DCM, 12.10, Earth Retaining Structures DCM, 12.11.2.6, Earth Pressure DCM, 12.11.2.7, Hydrostatic Pressure (Buoyancy) DCM, 12.5, Permanent and Transient Loads and Load Factors for Structures Supporting HST DCM, 12.5.1.10, Water Loads (WA) DCM, 12.5.1.2, Downdrag Force (DD) DCM, 12.5.1.3, Earth Pressure (EV, EH) DCM, 12.5.1.4, Earth Surcharge (ES) DCM, 12.5.1.5, Earth Settlement Effects (SE) DCM, 12.5.2.11, Hydrodynamic Force (WAD) DCM, 12.5.2.12, Dynamic Earth Pressures (ED) DCM, 12.6, Track-Structure Interaction DCM, 12.8.3.1, Shallow Foundation Design DCM, 12.8.3.2, Deep Foundation Design DCM, 12.8.6.13, Structure Deformation and Settlement DCM, 13.14.1, Design of Tunnels and Underground Structures DCM, 13.14.10, Landslips DCM, 13.14.9, Liquefaction DCM, 13.4, Tunnel Portals DCM, 13.8.2, Ground Considerations DCM, 13.9.8, Portals and Shafts DCM, 7.3, Grading, Side Slopes, and Retaining Walls for Roadway and Site Embankments DCM, 7.3.1, Side Slopes DCM, 7.5, Slope/Surface Protection Systems Best Management Practices DCM, 7.7, Site Work – Authority Facilities
	2.3.1.11 Aerodynamic Effects	
IF 5927	2.3.1.11.1 Interface between O&M SAF Aerodynamic Effects and GWY Infrastructure	



ID	Interface	Document Reference(s)
	<u>Purpose/Scope:</u> Ensures that the O&M safety aerodynamic effects requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.4.2, Passing train effects persons or vehicles adjacent to but outside the HSR R-O-W Certifiable Elements and Hazards Log, 1.2.2.7, Air pressure pulses as train passes through confined space at high speed. Certifiable Elements and Hazards Log, 1.2.2.8, Pressure buildup as HSR trains pass each other at speed in confined spaces. DCM, 12.7.1.7, Slipstream Effects from Passing Trains DCM, 13.2, Regulations, Codes, Standards, and Guidelines DCM, 13.3.12, Aerodynamic Considerations DCM, 3.5, Track Center Spacing DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 7.8.1.2, Walls Drawing DD-TN-200, BASIC TUNNEL CONFIGURATION, SINGLE TRACK TWIN TBM BORED TUNNEL, DOUBLE TRAIN (1312 FT) Drawing DD-TN-201, BASIC TUNNEL CONFIGURATION SINGLE TRACK TWIN TBM BORED TUNNEL SINGLE TRAIN (660 FT) Drawing DD-TN-202, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL DOUBLE TRAIN (1312 FT) Drawing DD-TN-203, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL SINGLE TRAIN (660 FT) Drawing DD-TN-204, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL, DOUBLE TRAIN (1312 FT) Drawing DD-TN-205, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT) Drawing DD-TN-206, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL DOUBLE TRAIN (1312 FT) Drawing DD-TN-207, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)
	2.3.1.12 Derailment Containment Structures	
IF 3355	2.3.1.12.1 Interface between O&M SAF Derailment Containment Structure Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u>	Certifiable Elements and Hazards Log, 1.1.1.1, Track Failure



ID	Interface	Document Reference(s)
	Ensures that the O&M safety derailment containment structure (protection wall) requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.1.1.2, Track Abnormality Certifiable Elements and Hazards Log, 1.2.1.9, Train falls from elevated structure. DCM, 12.5.2.13, Derailment Loads (DR) DCM, 12.5.2.13, Derailment Loads (DR) DCM, 12.5.2.13.2, Track Side Containment DCM, 12.5.2.13.2, Track Side Containment DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 6.4, Containment of HST Rolling Stock Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-002, TYPICAL CROSS SECTION, AERIAL STRUCTURE, ONE TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE Drawing DD-ST-017, TYPICAL CROSS SECTION, AERIAL STRUCTURE, FOUR TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER
	2.3.1.13 Tunnel Ventilation	
IF 5915	2.3.1.13.1 Interface between O&M SAF Tunnel Ventilation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety tunnel ventilation requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel DCM, 13.15.4, Facility Services and Infrastructure DCM, 13.17.1, A Shorter Tunnel up to One-Half Mile in Length DCM, 13.17.4, Tunnel Longer than One-Half Mile in Length DCM, 13.2, Regulations, Codes, Standards, and Guidelines DCM, 13.3.17, Ventilation Shafts DCM, 13.3.5, Clearances DCM, 13.5, Tunnel Ventilation Requirements and Configurations DCM, 13.5.1, Mechanical Ventilation DCM, 13.5.2, Ventilation Configurations



ID	Interface	Document Reference(s)
		DCM, 13.5.3, Design Considerations DCM, 13.5.4, Train Operation DCM, 17.11.5, Tunnel Ventilation System DCM, 17.2, Regulations, Codes, Standards, and Guidelines DCM, 17.5.1, Safety Design Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-401, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Drawing DD-TN-402, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, LONG SECTION Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-404, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, FRONT ELEVATION Drawing DD-TN-405, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, LONG SECTION Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-407, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Drawing DD-TN-408, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, LONG SECTION
	2.3.1.14 Power Supply & Lighting	
IF 6231	2.3.1.14.1 Interface between O&M SAF Power Supply Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety power supply requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel structure Certifiable Elements and Hazards Log, 1.2.2.5, Evacuation from tunnel structure DCM, 13.15.4, Facility Services and Infrastructure DCM, 13.16.17, Emergency Power Supply DCM, 13.16.4.2, Fixed Facility Power DCM, 17.1, Scope DCM, 17.11.10, Specialized Equipment for First Responders (within Tunnels) DCM, 17.3, Description of the Facility Power System DCM, 17.4, Classifications of Electrical Loads



ID	Interface	Document Reference(s)
		DCM, 17.7.1.1, Tunnel Ventilation System DCM, 17.8, Emergency Power Supply Systems DCM, 17.8.1, Emergency Power Supply Equipment DCM, 17.8.1.1, Emergency Standby Generators DCM, 17.8.1.2, Uninterruptible Power Supplies DCM, 17.8.1.3, DC Battery Systems
IF 5917	2.3.1.14.2 Interface between O&M SAF Lighting Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety lighting requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel Certifiable Elements and Hazards Log, 1.2.2.5, Evacuation from tunnel structure DCM, 13.15.4, Facility Services and Infrastructure DCM, 13.16.15, Emergency Command Post DCM, 13.16.9, Area Lighting DCM, 13.17.1, A Shorter Tunnel up to One-Half Mile in Length DCM, 13.17.3, Shorter Tunnel with Constrained Access DCM, 13.3.5, Clearances DCM, 13.3.8, Escape Shafts and Escape Tunnels DCM, 13.3.9, Crosspassages DCM, 17.12.3, Emergency Lighting and Exit Signs DCM, 17.13.2, Tunnel /Trench Lighting DCM, 17.13.6, Yellow Lights DCM, 17.2, Regulations, Codes, Standards, and Guidelines DCM, 17.4, Classifications of Electrical Loads
	2.3.1.15 Fire Protection	
IF 5912	2.3.1.15.1 Interface between O&M SAF Fire Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M safety fire protection requirements have been addressed by the INF team.	Certifiable Elements and Hazards Log, 1.2.2.2, Fire or smoke inside tunnel Certifiable Elements and Hazards Log, 1.2.2.5, Evacuation from tunnel structure Certifiable Elements and Hazards Log, 1.2.3.2, Fire in below-grade structure. DCM, 13.3.5, Clearances DCM, 13.16.8, Fire Hydrants and Water Supply DCM, 18, Fire Protection (TBD)
	2.3.2 Interfaces with External	



ID	Interface	Document Reference(s)
	2.3.2.1 Utilities	
IF 2737	2.3.2.1.1 Interface between O&M SAF Utility Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M SAF utility access requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Traction power utilities • Facility power utilities • Gas/fuel lines utilities • Water utilities • Sewer utilities • Communications/telephone utilities • ... 	DCM, 9.5.6, Safety and Protection Measures
	2.4 Security	
	2.4.1 Interfaces with Guideway (excl. Trackwork)	
	2.4.1.1 TVA Mitigations	
IF 1237	2.4.1.1.1 Interface between O&M SEC Fencing Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M security fencing requirements have been addressed by the INF team.	DCM, 1.2.1, Infrastructure DCM, 1.2.8, Safety and Reliability DCM, 7.8.1, Access Control Devices DCM, 7.8.1.1, Fences DCM, 7.8.1.1.1, Access Restriction Fencing DCM, 7.8.1.1.2, Access Detering Fencing DCM, 7.8.1.4, Fencing and Traffic Barriers in combination DCM, 7.8.1.5, Gates DCM, 7.8.1.5.2, Walking Gates DCM, 7.8.1.5.3, Driving Gates DCM, 7.8.2, Access Control by Type of HST Trackway DCM, 7.8.2.1, At-Grade Trackway DCM, 7.8.2.2, At-Grade Trackway within Highway Corridor DCM, 7.8.2.4, At-Grade Trackway through High-Risk Trespassing Areas DCM, 7.8.2.5, Trackway in Cut or Fill (Embankment) Section DCM, 7.8.2.6, Trackway on Aerial Structure DCM, 7.8.2.7, Trackway on Retained Fill



ID	Interface	Document Reference(s)
		DCM, 7.8.2.8, Trackway on Retained Cut (Open) DCM, 7.8.2.9, Trackway Underground (Bored, Mined, and Cut-and-Cover Tunnels) DCM, 7.8.4.2, Roadway Overpasses Crossing HST Trackway DCM, 7.8.4.5, Emergency Exits and Equipment Rooms in Tunnels DCM, 7.8.4.6, Drainage Structures DCM, 7.9, Wildlife Crossing DCM, 8.5.1.3, Access Control Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT Drawing DD-CV-002, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, OPEN CUT Drawing DD-CV-003, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL Drawing DD-CV-004, TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT Drawing DD-CV-005, TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-CV-008, FENCING ON GRADE SEPARATED STRUCTURES Drawing DD-CV-009, FENCE AT CULVERT CROSSINGS Drawing DD-IP-001, EARTHWORK BERM, RAILROAD ADJACENT TO HST Drawing DD-IP-002, BARRIERS IN SHARED CORRIDOR Drawing DD-IP-004, IN SHARED AND ADJACENT CORRIDOR, AT-GRADE Drawing DD-IP-005, AT-GRADE BERM OR DITCH ON HST GUIDEWAY, RAILROAD ADJACENT TO HST Drawing DD-IP-007, HST TRENCH AND RETAINING WALL PROTECTION Drawing DD-IP-008, ADJACENT TO HIGHWAY/ROADWAY Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY Drawing DD-ST-018, TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY Drawing DD-ST-019, TYPICAL CROSS SECTION, ONE TRACK TRENCH Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE



ID	Interface	Document Reference(s)
		TUNNEL CONFIGURATION, PLAN Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN General Provisions, 26.2.2, Site-Specific Health and Safety Plan General Provisions, 26.2.3, Site-Specific Security Plan Elements General Provisions, 7.8.6, Warranty Service Threat and Vulnerability Analysis, 1.4.1, Fencing
IF 6265	2.4.1.1.2 Interface between O&M SEC Signage Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M security signage requirements have been addressed by the INF team.	DCM, 7.7.4, Signage DCM, 7.8.1.6, Fence Signage General Provisions, 26.2.3, Site-Specific Security Plan Elements Threat and Vulnerability Assessment, 1.4.2, Signage
IF 6278	2.4.1.1.3 Interface between O&M SEC Security Patrol Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M security patrol requirements have been addressed by the INF team.	General Provisions, 26.2.3, Site-Specific Security Plan Elements Threat and Vulnerability Assessment, 1.4.3, Security Patrols
	3 Systems	
	3.1 Traction Power	
	3.1.1 Interfaces with Operations & Maintenance	
	3.1.1.1 Maintenance	
IF 878	3.1.1.1.1 Interface between O&M MoI TP Facility Site Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI TP facility site access requirements have been addressed by the INF team.	DCM, 7.7.1.1, Access Roads DCM, 7.7.5.1, Parking Facilities for Wayside Facilities DCM, 7.8.1.5, Gates DCM, 7.8.3.2, Train Control, Communications and Traction Power Facilities Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-SY-010, TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES Drawing DD-TP-D101, CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH TWO HIGH-VOLTAGE TRANSFORMERS Drawing DD-TP-D102, CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION



ID	Interface	Document Reference(s)
		WITH THREE HIGH-VOLTAGE TRANSFORMERS Drawing DD-TP-D201, CONCEPTUAL LAYOUT SWITCHING STATION Drawing DD-TP-D301, CONCEPTUAL LAYOUT PARALLELING STATION Maintenance of Infrastructure, 2, CHST Infrastructure System And Maintainability Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 2.6, Electric Traction Maintenance of Infrastructure, 9.4, Right of Way Access Maintenance of Infrastructure, 9.6, Electric Power Transmission System (TPS)
	3.1.2 Interfaces with Guideway (excl. Trackwork)	
	3.1.2.1 Track Alignment	
IF 80	3.1.2.1.1 Interface between SYS TP Maximum Grade @ Phase Break Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP system maximum grade @ phase break requirements have been addressed by the INF team.	DCM, 20.7.2, Spacing of Traction Power Facilities DCM, 4.5.1, Maximum Grades
	3.1.2.2 Traction Power Facilities & Wayside Power Cubicles (Sites)	
IF 5597	3.1.2.2.1 Interface between SYS TP Facility & WPC Site Location Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP facility & WPC site location (where to install, not size) requirements have been addressed by the INF team.	DCM, 13.16.14, Overhead Contact System Motorized Disconnect Switch DCM, 13.16.4.1, Traction Power DCM, 13.3.10, Equipment Requirements and Tunnel Niches DCM, 20.12.1, Wayside Power Control Cubicles DCM, 20.7.2, Spacing of Traction Power Facilities DCM, 20.7.3, Additional Location Requirements Drawing DD-TC-004, STATION INTERLOCKING LAYOUT-TYPICAL Drawing DD-TC-005, UNIVERSAL INTERLOCKING LAYOUT-TYPICAL Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT Drawing DD-TP-D401, CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES
IF 4271	3.1.2.2.2 Interface between SYS TP Facility & WPC	



ID	Interface	Document Reference(s)
	Site Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP facility & WPC site spatial (site, not location) requirements have been addressed by the INF team.	DCM, 13.16.14, Overhead Contact System Motorized Disconnect Switch DCM, 13.16.21, Parking for Tunnel Maintenance and Traction Power Facility DCM, 13.3.10, Equipment Requirements and Tunnel Niches DCM, 20.12.1, Wayside Power Control Cubicles DCM, 20.9.1, General Site Requirements DCM, 20.9.23, Real Estate Requirements: Approximate Footprints for the TPF DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 7.7.1.1, Access Roads DCM, 7.7.5.1, Parking Facilities for Wayside Facilities DCM, 7.8.1.5, Gates DCM, 7.8.3.2, Train Control, Communications and Traction Power Facilities DCM, 8.6.7, Facilities Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT Drawing DD-TP-D101, CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH TWO HIGH-VOLTAGE TRANSFORMERS Drawing DD-TP-D102, CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH THREE HIGH-VOLTAGE TRANSFORMERS Drawing DD-TP-D201, CONCEPTUAL LAYOUT SWITCHING STATION Drawing DD-TP-D301, CONCEPTUAL LAYOUT PARALLELING STATION
IF 871	3.1.2.2.3 Interface between SYS TP Facility & WPC Site Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TPF & WPC site foundation requirements have been addressed by the INF team.	DCM, 12.7.2, Foundations for Equipment Enclosures DCM, 20.12.1, Wayside Power Control Cubicles DCM, 20.9.3, Foundations DCM, 8.3, Policies



ID	Interface	Document Reference(s)
		DCM, 8.6.7, Facilities Drawing DD-TC-004, STATION INTERLOCKING LAYOUT-TYPICAL Drawing DD-TC-005, UNIVERSAL INTERLOCKING LAYOUT-TYPICAL Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT Drawing DD-TP-D121, TRACTION POWER SUBSTATION HIGH VOLTAGE EQUIPMENT Drawing DD-TP-D501, TYPICAL TRANSFORMER OIL CONTAINMENT SYSTEM Drawing DD-TP-E112, TYPICAL EQUIPMENT ARRANGEMENT PREFABRICATED ENCLOSURES TRACTION POWER SUBSTATION-CABLE VAULT Drawing DD-TP-E202, TYPICAL EQUIPMENT ARRANGEMENTS PREFABRICATED ENCLOSURES WAYSIDE POWER CONTROL CUBICLE-ELEVATION
	3.1.2.3 Wayside/Field Equipment	
IF 1143	3.1.2.3.1 Interface between SYS TP Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP wayside/field equipment spatial requirements have been addressed by the INF team.	DCM, 12.14.6, Trackside Equipment DCM, 13.3.10, Equipment Requirements and Tunnel Niches DCM, 13.3.5, Clearances DCM, 20.7.3, Additional Location Requirements DCM, 3.3.1, Vertical Clearances DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels Drawing DD-CD-003, AT-GRADE TRACK, DRAINAGE SYSTEM Drawing DD-TN-112, TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT Drawing DD-TP-D111, TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D112, TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D211, SWITCHING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW



ID	Interface	Document Reference(s)
		Drawing DD-TP-D212, SWITCHING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D311, PARALLELING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D312, PARALLELING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D401, CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES Drawing DD-TP-F101, TYPICAL SINGLE CATENARY FEEDING GANTRY ARRANGEMENT Drawing DD-TP-F102, TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT Drawing DD-TP-F201, TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE Drawing DD-TP-F301, TYPICAL CATENARY FEEDING ARRANGEMENT IN OPEN TRENCH LOCATIONS
IF 5671	3.1.2.3.2 Interface between SYS TP Wayside/Field Equipment Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP wayside/field equipment foundation requirements have been addressed by the INF team.	DCM, 12.14.6, Tracksides Equipment DCM, 12.5.3.2, Loads for Design of Traction Power Facility Gantry Pole Foundation DCM, 12.8.9, OCS Pole Supports DCM, 20.9.3, Foundations DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels Drawing DD-TP-D111, TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D112, TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D211, SWITCHING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW



ID	Interface	Document Reference(s)
		Drawing DD-TP-D212, SWITCHING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D311, PARALLELING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D312, PARALLELING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D401, CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES Drawing DD-TP-F101, TYPICAL SINGLE CATENARY FEEDING GANTRY ARRANGEMENT Drawing DD-TP-F102, TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT Drawing DD-TP-F201, TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE Drawing DD-TP-F301, TYPICAL CATENARY FEEDING ARRANGEMENT IN OPEN TRENCH LOCATIONS
	3.1.2.4 Conduits & Cables	
IF 885	3.1.2.4.1 Interface between SYS TP Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP conduit, duct bank, cable trough & manhole requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Overhead or duct bank from TPF to Main Gantry • Overhead from Main Gantry to Strain Gantry • Return System to Gantries • Feeder cables • Return cables • Surface conduits (multiple, large diameter) • Embedded conduits • ... 	DCM, 12.14.4, Conduit Risers DCM, 12.14.5, Embedded Conduits DCM, 12.8.9, OCS Pole Supports DCM, 13.15.3, Embedded Conduit and Cable Trough DCM, 13.3.5, Clearances DCM, 20.10.3, Raceway DCM, 20.10.5, Electrical Manholes and Pullboxes DCM, 20.10.6, Cable Trenches for Power Cables DCM, 20.10.7, Conductors DCM, 20.10.7.1, General DCM, 20.10.7.2, Segregation DCM, 20.10.7.3, Sizes of Low Voltage Power and Control Cables DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and



ID	Interface	Document Reference(s)
		Fixed Equipment Envelope, In Tunnels DCM, 9.4.1, Electrical DCM, 9.4.1.1, Duct Banks DCM, 9.4.1.2, Manholes and Handholes DCM, 9.5.4.5, Placement DCM, 9.5.4.6, Carrier Pipes Drawing DD-TP-D111, TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D112, TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D211, SWITCHING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D212, SWITCHING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D311, PARALLELING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW Drawing DD-TP-D312, PARALLELING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW Drawing DD-TP-D401, CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES Drawing DD-TP-E202, TYPICAL EQUIPMENT ARRANGEMENTS PREFABRICATED ENCLOSURES WAYSIDE POWER CONTROL CUBICLE-ELEVATION Drawing DD-TP-F101, TYPICAL SINGLE CATENARY FEEDING GANTRY ARRANGEMENT Drawing DD-TP-F102, TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT Drawing DD-TP-F201, TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE Drawing DD-TP-F301, TYPICAL CATENARY FEEDING ARRANGEMENT IN OPEN TRENCH LOCATIONS Drawing DD-TP-G101, TYPICAL SUBSTATION NEUTRAL RETURN SYSTEM DIAGRAM Drawing DD-TP-G111, TYPICAL SWITCHING STATION NEUTRAL RETURN SYSTEM DIAGRAM Drawing DD-TP-N101, TYPICAL 25KV DUCT BANK DETAIL Drawing DD-TP-N111, TYPICAL 25KV MANHOLE DETAILS
	3.1.2.5 Dead & Live Loads	



ID	Interface	Document Reference(s)
IF 3019	3.1.2.5.1 Interface between SYS TP System Dead Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP system dead load requirements have been addressed by the INF team.	DCM, 12.5.3.1, Loads for Design of Overhead Contact System Pole Foundation DCM, 12.5.3.2, Loads for Design of Traction Power Facility Gantry Pole Foundation DCM, 20.9.3, Foundations
	3.1.2.6 Utilities	
IF 2606	3.1.2.6.1 Interface between SYS TP Utility Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP system utility spatial requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Traction power • Electrical utility (e.g. PG&E) • Gas/fuel • Water • Sewer • Communications 	DCM, 20.4.6, High-Voltage Utility Connections DCM, 20.9.23, Real Estate Requirements: Approximate Footprints for the TPF DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 9.4.1, Electrical DCM, 9.4.1.3, Service Connections Drawing DD-TP-C511, CONCEPTUAL LOCATIONS UTILITY HIGH VOLTAGE SWITCHING STATION AND TRACTION POWER SUBSTATION
	3.2 Overhead Contact System	
	3.2.1 Interfaces with Guideway (excl. Trackwork)	
	3.2.1.1 Pantograph Clearances	
IF 656	3.2.1.1.1 Interface between SYS OCS Pantograph Clearance Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS pantograph clearance envelope requirements have been addressed by the INF team (actual wayside equipment is addressed elsewhere).	DCM, 13.3.5, Clearances DCM, 21.14.10, Applicable Pantograph and OCS Clearance Envelopes DCM, 21.14.8, Electrical Clearances to Rail Vehicles and Structures DCM, 21.14.9, Clearance Envelope at Fixed Structures DCM, 21.6.2, Geometry of the Pantographs DCM, 21.6.3, Compliance of the Overhead Contact Line System with the Infrastructure Gauge DCM, 3.3.1, Vertical Clearances DCM, 3.4, Vehicle Clearance Envelopes



ID	Interface	Document Reference(s)
		<p>DCM, 3.7.1, Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track</p> <p>DCM, 3.7.2, Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation</p> <p>DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section</p> <p>DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels</p> <p>Drawing DD-CV-010, MINIMUM CLEARANCE, GRADE SEPARATED STRUCTURES</p> <p>Drawing DD-OC-2071, PANTOGRAPH CLEARANCE ENVELOPE OPEN ROUTE-DEDICATED TRACK-220 MPH SEGMENT</p> <p>Drawing DD-OC-2072, PANTOGRAPH CLEARANCE ENVELOPE TUNNEL-DEDICATED TRACK-220 MPH SEGMENT</p> <p>Drawing DD-TN-200, BASIC TUNNEL CONFIGURATION, SINGLE TRACK TWIN TBM BORED TUNNEL, DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-201, BASIC TUNNEL CONFIGURATION SINGLE TRACK TWIN TBM BORED TUNNEL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-202, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-203, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-204, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL, DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-205, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-206, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL DOUBLE TRAIN (1312 FT)</p> <p>Drawing DD-TN-207, BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE BORED TUNNEL WITHOUT SEPARATION WALL SINGLE TRAIN (660 FT)</p> <p>Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL</p> <p>Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL</p> <p>Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED</p>



ID	Interface	Document Reference(s)
		EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
	3.2.1.2 Wayside/Field Equipment	
IF 3299	3.2.1.2.1 Interface between SYS OCS Structure & Wire Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS structure & wire spatial requirements have been addressed by the INF team.	DCM, 13.3.5, Clearances DCM, 21.1, Scope DCM, 21.12, Sectionalizing and Switching DCM, 21.14.7, Clearances for Utility Lines Crossing over the Electrified Railroad DCM, 21.14.8, Electrical Clearances to Rail Vehicles and Structures DCM, 21.14.9, Clearance Envelope at Fixed Structures DCM, 21.15.1, General DCM, 21.15.2, OCS Pole and Foundation Requirements DCM, 21.15.3, OCS Poles DCM, 21.16, Traction Power Return System DCM, 21.6.1, Geometry of the Overhead Contact Line DCM, 21.6.2, Geometry of the Pantographs DCM, 21.6.3, Compliance of the Overhead Contact Line System with the Infrastructure Gauge DCM, 21.8.1, Contact Wire DCM, 21.8.2, Messenger Wire DCM, 21.8.3, Stitch Wire DCM, 21.8.4, Hanger Wire DCM, 21.8.5, Alternate Conductors DCM, 21.9, Other Overhead Conductors and Cables DCM, 21.9.1, Parallel Negative Feeder DCM, 21.9.2, Static (Ground) Wire DCM, 21.9.3, Insulated 25 kV Cable DCM, 21.9.4, Insulated Return Cable DCM, 3.3.1, Vertical Clearances DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.5, Track Center Spacing DCM, 9.5.5, Utility Clearances



ID	Interface	Document Reference(s)
		<p>Drawing DD-CV-010, MINIMUM CLEARANCE, GRADE SEPARATED STRUCTURES</p> <p>Drawing DD-OC-2011, TYPICAL OPEN ROUTE HIGH SPEED OCS CONFIGURATION - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2012, TYPICAL OCS STRUCTURE FOR TANGENT TRACKS IN OPEN ROUTE - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2013, TYPICAL OCS STRUCTURE FOR TWO CURVED TRACKS IN OPEN ROUTE - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2014, TYPICAL OCS SUPPORT STRUCTURE ON VIADUCT-TANGENT TRACKS - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2015, TYPICAL OCS SUPPORT STRUCTURE ON VIADUCT-CURVED TRACKS - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2016, TYPICAL OCS PORTAL STRUCTURE ARRANGEMENT ON TANGENT TRACK WITH TURNOUT - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2017, TYPICAL OCS PORTAL STRUCTURE ARRANGEMENT ON THREE CURVED TRACKS- 220 MPH SEGMENT</p> <p>Drawing DD-OC-2018, TYPICAL OCS PORTAL STRUCTURE ON FOUR TANGENT TRACKS - 220 MPH SEGMENT</p> <p>Drawing DD-OC-2019, TYPICAL OCS SUPPORT STRUCTURE FOR 4 TRACKS INTERMEDIATE STATION-220 MPH SEGMENT</p> <p>Drawing DD-OC-2020, TYPICAL OCS STRUCTURE FOR CIRCULAR TUNNEL ON TANGENT TRACKS-220 MPH SEGMENT</p> <p>Drawing DD-OC-2021, TYPICAL OCS STRUCTURE FOR MINED TUNNEL ON TANGENT TRACKS-220 MPH SEGMENT</p> <p>Drawing DD-OC-2022, TYPICAL OCS STRUCTURE FOR CUT AND COVER TUNNEL ON TANGENT TRACKS-220 MPH SEGMENT</p> <p>Drawing DD-OC-2023, TYPICAL OPEN TRENCH OCS STRUCTURE TANGENT TRACKS WITH CENTER WALKWAY-220 MPH SEGMENT</p> <p>Drawing DD-OC-2024, TYPICAL OPEN TRENCH OCS STRUCTURE CURVED TRACKS WITH CENTER WALKWAY-220 MPH SEGMENT</p> <p>Drawing DD-OC-2025, TYPICAL OPEN TRENCH OCS STRUCTURE ON TANGENT TRACK WITH SIDE WALKWAY-220 MPH SEGMENT</p> <p>Drawing DD-OC-2026, TYPICAL OPEN TRENCH OCS STRUCTURE ON CURVED TRACK WITH SIDE WALKWAY-220 MPH SEGMENT</p> <p>Drawing DD-OC-2027, TYPICAL SINGLE OPEN TRENCH OCS STRUCTURE OCS WALL MOUNTED ON TANGENT TRACKS-220 MPH SEGMENT</p> <p>Drawing DD-OC-2028, TYPICAL SINGLE OPEN TRENCH OCS STRUCTURE OCS WALL MOUNTED ON CURVED TRACKS-220 MPH SEGMENT</p>



ID	Interface	Document Reference(s)
		Drawing DD-OC-2029, TYPICAL OCS PORTAL STRUCTURE OPEN TRENCH/TUNNEL PORTAL ON TANGENT TRACKS-220 MPH SEGMENT Drawing DD-OC-2035, TYPICAL CIRCULAR TUNNEL OCS STRUCTURE WITHOUT CENTER WALL ON TANGENT TRACKS-220 MPH SEGMENT Drawing DD-OC-2036, TYPICAL MINED TUNNEL OCS STRUCTURE WITHOUT CENTER WALL ON TANGENT TRACKS-220 MPH SEGMENT Drawing DD-OC-2037, TYPICAL CUT & COVER TUNNEL OCS STRUCTURE WITHOUT CENTER WALL ON TANGENT TRACKS-220 MPH SEGMENT Drawing DD-OC-2041, TYPICAL JUMPER AND CONTACT WIRE CROSSING ARRANGEMENTS-220 MPH SEGMENT Drawing DD-OC-2042, TYPICAL 25KV HIGH SPEED SECTION INSULATOR ARRANGEMENT FOR CROSSOVER AND TURNOUT-220 MPH SEGMENT Drawing DD-OC-2050, TYPICAL OCS CROSSOVER ARRANGEMENT WITH AIR GAP-220 MPH SEGMENT Drawing DD-OC-2053, TYPICAL UNINSULATED CATENARY OVERLAP FIVE SPAN ARRANGEMENT-220 MPH SEGMENT Drawing DD-OC-2057, TYPICAL INSULATED CATENARY OVERLAP FIVE SPAN ARRANGEMENT-220 MPH SEGMENT Drawing DD-OC-2058, TYPICAL CANTILEVER ARRANGEMENT FIVE SPAN INSULATED AND UNINSULATED OVERLAPS-220 MPH SEGMENT
IF 5752	3.2.1.2.2 Interface between SYS OCS Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS wayside/field equipment spatial requirements have been addressed by the INF team.	DCM, 13.16.14, Overhead Contact System Motorized Disconnect Switch DCM, 13.17.1, A Shorter Tunnel up to One-Half Mile in Length DCM, 13.17.3, Shorter Tunnel with Constrained Access DCM, 13.3.10, Equipment Requirements and Tunnel Niches DCM, 13.3.5, Clearances DCM, 21.1, Scope DCM, 21.12.2, Phase Breaks DCM, 21.12.3, OCS Sectionalizing in Tunnels DCM, 21.12.4, Disconnect Switches DCM, 21.14.8, Electrical Clearances to Rail Vehicles and Structures DCM, 21.14.9, Clearance Envelope at Fixed Structures DCM, 21.4, Overhead Contact System Description and General Performance Requirements



ID	Interface	Document Reference(s)
		DCM, 21.6.1, Geometry of the Overhead Contact Line DCM, 21.6.3, Compliance of the Overhead Contact Line System with the Infrastructure Gauge DCM, 3.3.1, Vertical Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels Drawing DD-OC-2030, TYPICAL TWIN BALANCE WEIGHT ARRANGEMENT TERMINATION IN OPEN ROUTE-220 MPH SEGMENT Drawing DD-OC-2031, TYPICAL OCS MIDPOINT ANCHOR ARRANGEMENT IN OPEN ROUTE-220 MPH SEGMENT Drawing DD-OC-2032, TYPICAL OCS FIXED TENSION TERMINATION ARRANGEMENT-OPEN ROUTE-220 MPH SEGMENT Drawing DD-OC-2033, TYPICAL OCS SUPPORT WITH AUXILIARY POWER FOR TWO TANGENT TRACKS IN OPEN ROUTE-220 MPH SEGMENT Drawing DD-OC-2034, TYPICAL OCS SUPPORT STRUCTURE WITH DISCONNECT SWITCH-220 MPH SEGMENT Drawing DD-OC-2038, TYPICAL BORED TUNNEL OCS STRUCTURE WITH DISCONNECT SWITCH ARRANGEMENT-220 MPH SEGMENT Drawing DD-OC-2038, TYPICAL BORED TUNNEL OCS STRUCTURE WITH DISCONNECT SWITCH ARRANGEMENT-220 MPH SEGMENT
IF 5766	3.2.1.2.3 Interface between SYS OCS Phase Break Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS wayside/field equipment spatial requirements have been addressed by the INF team.	DCM, 20.7.3, Additional Location Requirements DCM, 21.12.2, Phase Breaks DCM, 21.4, Overhead Contact System Description and General Performance Requirements DCM, 3.3.1, Vertical Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels



ID	Interface	Document Reference(s)
		Drawing DD-OC-2043, TYPICAL OCS PHASE BREAK ARRANGEMENT WITH NEUTRAL SECTION-220 MPH SEGMENT
	3.2.1.3 Foundations & Support Structures	
IF 898	3.2.1.3.1 Interface between SYS OCS Foundation & Supporting Structure Location Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS foundation & supporting structure location requirements have been addressed by the INF team.	DCM, 12.14.9, Overhead Anchors DCM, 12.5.3.1, Loads for Design of Overhead Contact System Pole Foundation DCM, 12.8.9, OCS Pole Supports DCM, 13.15.1, Catenary Support Provisions DCM, 21.15.1, General DCM, 21.15.2, OCS Pole and Foundation Requirements DCM, 21.15.3, OCS Poles DCM, 21.6.1, Geometry of the Overhead Contact Line Drawing DD-OC-2011, TYPICAL OPEN ROUTE HIGH SPEED OCS CONFIGURATION - 220 MPH SEGMENT
IF 5780	3.2.1.3.2 Interface between SYS OCS Foundation & Supporting Structure Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS foundation & supporting structure spatial requirements have been addressed by the INF team.	DCM, 12.14.9, Overhead Anchors DCM, 12.5.3.1, Loads for Design of Overhead Contact System Pole Foundation DCM, 12.8.9, OCS Pole Supports DCM, 13.15.1, Catenary Support Provisions DCM, 21.15.1, General DCM, 21.15.2, OCS Pole and Foundation Requirements DCM, 21.15.4, OCS Foundations Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE
	3.2.1.4 Conduits & Cables	
IF 886	3.2.1.4.1 Interface between SYS OCS Conduit, Duct Bank & Manhole Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS conduit, duct bank & manhole requirements have been addressed by the INF team, including but not limited to:	DCM, 12.14.4, Conduit Risers DCM, 12.14.5, Embedded Conduits DCM, 12.8.9, OCS Pole Supports DCM, 13.15.3, Embedded Conduit and Cable Trough



ID	Interface	Document Reference(s)
	<ul style="list-style-type: none"> • Traction power return • Grounding • Cross bonding • Disconnect switches • Switch heater power supply • Switch heater power distribution • ... 	DCM, 21.17.1, Traction Power Supply System DCM, 21.17.3, Train Control System DCM, 21.17.4, Communications System DCM, 21.17.6, Trackwork DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 9.4.1, Electrical DCM, 9.4.1.1, Duct Banks DCM, 9.4.1.2, Manholes and Handholes DCM, 9.5.4.5, Placement DCM, 9.5.4.6, Carrier Pipes Drawing DD-OC-2033, TYPICAL OCS SUPPORT WITH AUXILIARY POWER FOR TWO TANGENT TRACKS IN OPEN ROUTE-220 MPH SEGMENT Drawing DD-OC-2034, TYPICAL OCS SUPPORT STRUCTURE WITH DISCONNECT SWITCH-220 MPH SEGMENT Drawing DD-OC-2038, TYPICAL BORED TUNNEL OCS STRUCTURE WITH DISCONNECT SWITCH ARRANGEMENT-220 MPH SEGMENT
	3.2.1.5 Dead & Live Loads	
IF 3018	3.2.1.5.1 Interface between SYS OCS Dead Load, Additional Load & Capacity Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS dead load, additional load and capacity protection requirements have been addressed by the INF team.	DCM, 12.5.1.1, Dead Load (DC, DW) DCM, 12.5.3.1, Loads for Design of Overhead Contact System Pole Foundation DCM, 12.8.9, OCS Pole Supports DCM, 21.15.2, OCS Pole and Foundation Requirements DCM, 21.15.3, OCS Poles DCM, 21.15.4, OCS Foundations
	3.2.1.6 Protective Screens	
IF 5641	3.2.1.6.1 Interface between SYS OCS Protective Screening & Barrier Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS protective screening & barrier	DCM, 21.14, OCS Clearances and Protection against Electric Shock DCM, 21.14.2, Protection by Clearances from Standing Surfaces



ID	Interface	Document Reference(s)
	requirements have been addressed by the INF team.	DCM, 21.14.3, Protective Screening and Barriers for Standing Surfaces in Public Areas DCM, 21.14.4, Protective Screening and Barriers for Standing Surfaces in Restricted Areas DCM, 7.8.4.2, Roadway Overpasses Crossing HST Trackway Drawing DD-CV-008, FENCING ON GRADE SEPARATED STRUCTURES Drawing DD-OC-2044, TYPICAL PROTECTION BARRIERS ARRANGEMENT, AT OVERHEAD BRIDGE, 220 MPH SEGMENT
	3.3 Automatic Train Control	
	3.3.1 Interfaces with Operations & Maintenance	
	3.3.1.1 Maintenance	
IF 831	3.3.1.1.1 Interface between O&M MoI ATC Interlocking & TCC House Site Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI ATC Interlocking & TCC house site access requirements have been addressed by the INF team.	Maintenance of Infrastructure, 2.2, Interlockings Maintenance of Infrastructure, 2.4, Operating and Communications Systems Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 3.2, CHST Infrastructure Support Facilities Maintenance of Infrastructure, 9.3.5, Signal System Maintenance of Infrastructure, 9.4, Right of Way Access Drawing DD-SY-010, TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT DCM, 7.7.5.1, Parking Facilities for Wayside Facilities DCM, 7.8.1.5, Gates DCM, 7.8.3.2, Train Control, Communications and Traction Power Facilities DCM, 7.7.1.1, Access Roads Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-SY-010, TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES
	3.3.2 Interfaces with Guideway (excl. Trackwork)	
	3.3.2.1 Interlockings / TCC Houses (Sites)	
IF 5611	3.3.2.1.1 Interface between SYS ATC Interlocking & TCC House Site Location Requirements and	



ID	Interface	Document Reference(s)
	GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC interlocking & TCC house site location (where to install, not size) requirements have been addressed by the INF team.	DCM, 24.3.12, Hardware Requirements DCM, 24.8.8, Equipment Enclosures Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT
IF 794	3.3.2.1.2 Interface between SYS ATC Interlocking & TCC House Site Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC interlocking & TCC house site spatial requirements (site, not location) have been addressed by the INF team.	DCM, 24.3.12, Hardware Requirements DCM, 24.3.12, Hardware Requirements DCM, 24.8.8, Equipment Enclosures DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 7.7.1.1, Access Roads DCM, 7.7.5.1, Parking Facilities for Wayside Facilities DCM, 7.8.1.5, Gates DCM, 7.8.3.2, Train Control, Communications and Traction Power Facilities DCM, 8.6.7, Facilities Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT
IF 1049	3.3.2.1.3 Interface between SYS ATC Interlocking & TCC House Site Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC interlocking & TCC house site foundation requirements have been addressed by the INF team.	DCM, 12.7.2, Foundations for Equipment Enclosures DCM, 24.3, General Design Requirements DCM, 24.3.12, Hardware Requirements DCM, 8.3, Policies DCM, 8.6.7, Facilities Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT



ID	Interface	Document Reference(s)
	3.3.2.2 Wayside/Field Equipment	
IF 3304	3.3.2.2.1 Interface between SYS ATC Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC wayside/field equipment (not trackside) spatial requirements have been addressed by the INF team.	DCM, 12.14.6, Trackside Equipment DCM, 13.3.10, Equipment Requirements and Tunnel Niches DCM, 13.3.5, Clearances DCM, 24.3.12, Hardware Requirements DCM, 24.8, Wayside Equipment DCM, 24.8.1, Signals DCM, 24.8.2, Wayside Signs DCM, 24.8.3, Track Circuits DCM, 24.8.7, Switch Machines DCM, 24.8.8, Equipment Enclosures DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.6.4, Space Around Turnouts DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY Drawing DD-TC-009, TYPICAL DWARF SIGNAL LAYOUT Drawing DD-TC-011, SWITCH LAYOUT-MAIN LINE-HIGH SPEED-TYPICAL Drawing DD-TN-111, TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL



ID	Interface	Document Reference(s)
		Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
IF 5627	3.3.2.2.2 Interface between SYS ATC Wayside/Field Equipment Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC wayside/field equipment foundation requirements have been addressed by the INF team.	DCM, 12.14.6, Tracksides Equipment DCM, 12.8.9, OCS Pole Supports DCM, 24.3, General Design Requirements DCM, 24.3.12, Hardware Requirements DCM, 24.8.1, Signals DCM, 24.8.2, Wayside Signs DCM, 24.8.3, Track Circuits DCM, 24.8.7, Switch Machines DCM, 24.8.8, Equipment Enclosures Drawing DD-TC-009, TYPICAL DWARF SIGNAL LAYOUT Drawing DD-TC-011, SWITCH LAYOUT-MAIN LINE-HIGH SPEED-TYPICAL
	3.3.2.3 Conduits & Cables	
IF 876	3.3.2.3.1 Interface between SYS ATC Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC conduit, duct bank, cable trough & manhole requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Track circuits & cases • Signals • Transponder & LEU • Cross bonding • Signal power supply • Signal power distribution • ... 	DCM, 12.14.1, Cable Trough DCM, 12.14.4, Conduit Risers DCM, 12.14.5, Embedded Conduits DCM, 13.15.3, Embedded Conduit and Cable Trough DCM, 13.15.5, Design Requirements for Cable Troughs DCM, 24.3.12, Hardware Requirements DCM, 24.8.10, Cables, Cable Trough, and Conduit DCM, 24.8.13, Signal Power DCM, 28.5.6, Systems Conduits at Track DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 7.7.7, Walkways and Cable Trough



ID	Interface	Document Reference(s)
		<p>DCM, 9.4.1, Electrical</p> <p>DCM, 9.4.1.1, Duct Banks</p> <p>DCM, 9.4.1.2, Manholes and Handholes</p> <p>DCM, 9.5.4.5, Placement</p> <p>DCM, 9.5.4.6, Carrier Pipes</p> <p>Drawing DD-CO-G021, SYSTEMS LOW-VOLTAGE, DUCTBANK, TYPICAL CROSS SECTION DETAILS</p> <p>Drawing DD-CO-G022, SYSTEMS LOW VOLTAGE MANHOLE AND DUCTBANK TUNNEL, TYPICAL INSTALLATION DETAILS</p> <p>Drawing DD-CO-G023, SYSTEMS LOW-VOLTAGE, DUCTBANK, TYPICAL CROSS SECTION DETAILS</p> <p>Drawing DD-CO-G024, TYPICAL CROSS SECTION, SYSTEMS LOW VOLTAGE, UNDERGROUND CONDUIT DUCTBANK INSTALLATIONS, TWO TRACK TRENCH</p> <p>Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE</p> <p>Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE</p> <p>Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p>Drawing DD-ST-011, TYPICAL CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL</p> <p>Drawing DD-ST-012, CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-FRADE / CUT & COVER TUNNEL</p> <p>Drawing DD-ST-012, CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-FRADE / CUT & COVER TUNNEL</p> <p>Drawing DD-ST-013, TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>Drawing DD-SY-010, TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES</p> <p>Drawing DD-TC-004, STATION INTERLOCKING LAYOUT-TYPICAL</p> <p>Drawing DD-TC-005, UNIVERSAL INTERLOCKING LAYOUT-TYPICAL</p> <p>Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS</p> <p>Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL</p> <p>Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL</p>



ID	Interface	Document Reference(s)
		Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
	3.3.2.4 Dead & Live Loads	
IF 3017	3.3.2.4.1 Interface between SYS ATC System Dead Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC system dead load requirements have been addressed by the INF team, including but not limited to: • Wayside facilities	DCM, 24.8, Wayside Equipment DCM, 12.5.1.1, Dead Load (DC, DW) DCM, 12.5.3.1, Loads for Design of Overhead Contact System Pole Foundation
	3.3.2.5 Utilities	
IF 2611	3.3.2.5.1 Interface between SYS ATC System Utility Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC system utility spatial requirements have been addressed by the INF team, including but not limited to: • Electrical utility (e.g. PG&E) • Gas/fuel • Water • Sewer • Communications	DCM, 24.3.12, Hardware Requirements DCM, 24.8.13, Signal Power DCM, 24.8.15, Wayside Interfaces DCM, 9.4.1, Electrical DCM, 9.4.1.3, Service Connections
	3.4 Communications	
	3.4.1 Interfaces with Operations & Maintenance	
	3.4.1.1 Maintenance	
IF 5871	3.4.1.1.1 Interface between O&M Mol COM Equipment Shelter & Radio Tower Site Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol COM equipment shelter &	DCM, 7.7.1.1, Access Roads DCM, 7.7.5.1, Parking Facilities for Wayside Facilities



ID	Interface	Document Reference(s)
	radio tower site access requirements have been addressed by the INF team.	DCM, 7.8.1.5, Gates DCM, 7.8.3.2, Train Control, Communications and Traction Power Facilities Drawing DD-CO-F090, STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-SY-010, TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES Maintenance of Infrastructure, 2, CHST Infrastructure System And Maintainability Maintenance of Infrastructure, 2.4, Operating and Communications Systems Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 9.4, Right of Way Access
	3.4.2 Interfaces with Guideway (excl. Trackwork)	
	3.4.2.1 Equipment Shelter (Sites)	
IF 5653	3.4.2.1.1 Interface between SYS COM Equipment Shelter & Radio Tower Site Location Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM equipment shelter & radio tower site location (where to install, not size) requirements have been addressed by the INF team.	DCM, 28.4.5.1, Operations Radio System DCM, 28.4.5.3, Broadband Radio System DCM, 28.5.4, Standalone Radio Sites Drawing DD-CO-C001, COMMUNICATIONS SYSTEMS SITES AND LOCATIONS OVERVIEW Drawing DD-CO-F090, STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F091, CO-LOCATED RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-H001, STANDALONE RADIO SITE KEY PLAN Drawing DD-TC-025, TYPICAL INTERLOCKING AT STATIONS Drawing DD-TC-026, TYPICAL UNIVERSAL INTERLOCKING LAYOUT Drawing DD-TP-D101, CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH TWO HIGH-VOLTAGE TRANSFORMERS Drawing DD-TP-D102, CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH THREE HIGH-VOLTAGE TRANSFORMERS Drawing DD-TP-D201, CONCEPTUAL LAYOUT SWITCHING STATION Drawing DD-TP-D301, CONCEPTUAL LAYOUT PARALLELING STATION



ID	Interface	Document Reference(s)
IF 904	3.4.2.1.2 Interface between SYS COM Equipment Shelter & Radio Tower Site Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM equipment shelter & radio tower site spatial requirements have been addressed by the INF team.	DCM, 28.4.1.4, General Communications Systems Physical, Enclosure and Power DCM, 28.5.3, Communications Shelters DCM, 28.5.4, Standalone Radio Sites DCM, 3.3.2, Horizontal Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 6.3, Protection of HST Operating Infrastructure from Vehicle Intrusion DCM, 7.7.1.1, Access Roads DCM, 7.7.5.1, Parking Facilities for Wayside Facilities DCM, 7.8.1.5, Gates DCM, 7.8.3.2, Train Control, Communications and Traction Power Facilities DCM, 8.6.7, Facilities Drawing DD-CO-F070, SIGNALING EQUIPMENT HOUSE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F080, TRACTION POWER FACILITY, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F090, STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F091, CO-LOCATED RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F110, TUNNEL CROSS PASSAGE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CV-006, FENCE AND GATE DETAILS
IF 1048	3.4.2.1.3 Interface between SYS COM Equipment Shelter & Radio Tower Site Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM equipment shelter & radio tower site foundation requirements have been addressed by the INF team.	DCM, 12.7.2, Foundations for Equipment Enclosures DCM, 28.5.5, Radio Towers DCM, 8.3, Policies DCM, 8.6.7, Facilities Drawing DD-CO-F070, SIGNALING EQUIPMENT HOUSE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F080, TRACTION POWER FACILITY, COMMUNICATIONS



ID	Interface	Document Reference(s)
		SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F090, STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT Drawing DD-CO-F091, CO-LOCATED RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT
	3.4.2.2 Wayside/Field Equipment	
IF 600	3.4.2.2.1 Interface between SYS COM Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM wayside/field equipment spatial requirements have been addressed by the INF team.	DCM, 12.14.6, Tracksides Equipment DCM, 13.3.10, Equipment Requirements and Tunnel Niches DCM, 13.3.5, Clearances DCM, 28.4.1.4, General Communications Systems Physical, Enclosure and Power DCM, 28.4.1.5, General Communications Systems End-Devices DCM, 28.4.11.1, Telephone Subsystem DCM, 28.4.5.2, Operations Radio System at Trench and Tunnel Locations DCM, 28.4.5.4, Broadband Radio System at Trench and Tunnel Locations DCM, 28.4.5.5, Public Safety Trench and Tunnel Radio System DCM, 28.4.5.6, Radio Interoperability with External Agencies and First Responders DCM, 28.5.2, Communications Interface Cabinets DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels Drawing DD-CO-F100, WAYSIDE CIC Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY Drawing DD-TN-111, TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED



ID	Interface	Document Reference(s)
		EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
IF 5725	3.4.2.2.2 Interface between SYS COM Wayside/Field Equipment Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM wayside/field equipment foundation requirements have been addressed by the INF team.	DCM, 12.14.6, Tracksides Equipment DCM, 12.8.9, OCS Pole Supports DCM, 28.4.1.4, General Communications Systems Physical, Enclosure and Power DCM, 28.4.1.5, General Communications Systems End-Devices DCM, 28.5.2, Communications Interface Cabinets Drawing DD-CO-F100, WAYSIDE CIC
	3.4.2.3 Conduits & Cables	
IF 877	3.4.2.3.1 Interface between SYS COM Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM conduit, duct bank, cable trough & manhole requirements have been addressed by the INF team.	DCM, 12.14.1, Cable Trough DCM, 12.14.4, Conduit Risers DCM, 12.14.5, Embedded Conduits DCM, 13.15.3, Embedded Conduit and Cable Trough DCM, 13.15.5, Design Requirements for Cable Troughs DCM, 28.4.6, Cable Infrastructure DCM, 28.4.6.4, Cable Infrastructure Physical, Enclosure and Power DCM, 28.4.6.5, Cable Infrastructure End-Devices DCM, 28.5.6, Systems Conduits at Track DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and



ID	Interface	Document Reference(s)
		<p>Fixed Equipment Envelope, In Tunnels</p> <p>DCM, 7.7.7, Walkways and Cable Trough</p> <p>DCM, 9.4.1, Electrical</p> <p>DCM, 9.4.1.1, Duct Banks</p> <p>DCM, 9.4.1.2, Manholes and Handholes</p> <p>DCM, 9.5.4.5, Placement</p> <p>DCM, 9.5.4.6, Carrier Pipes</p> <p>Drawing DD-CO-F002, TYPICAL CONNECTIVITY BETWEEN COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT</p> <p>Drawing DD-CO-F003, TYPICAL CONNECTIVITY AT WAYSIDE SITES, PHYSICAL SITE LAYOUT</p> <p>Drawing DD-CO-G021, SYSTEMS LOW-VOLTAGE, DUCTBANK, TYPICAL CROSS SECTION DETAILS</p> <p>Drawing DD-CO-G022, SYSTEMS LOW VOLTAGE MANHOLE AND DUCTBANK TUNNEL, TYPICAL INSTALLATION DETAILS</p> <p>Drawing DD-CO-G023, SYSTEMS LOW-VOLTAGE, DUCTBANK, TYPICAL CROSS SECTION DETAILS</p> <p>Drawing DD-CO-G024, TYPICAL CROSS SECTION, SYSTEMS LOW VOLTAGE, UNDERGROUND CONDUIT DUCTBANK INSTALLATIONS, TWO TRACK TRENCH</p> <p>Drawing DD-CV-001, TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>Drawing DD-ST-001, TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p>Drawing DD-ST-003, TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE</p> <p>Drawing DD-ST-004, TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE</p> <p>Drawing DD-ST-010, TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p>Drawing DD-ST-011, TYPICAL CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL</p> <p>Drawing DD-ST-012, CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-FRADE / CUT & COVER TUNNEL</p> <p>Drawing DD-ST-013, TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>Drawing DD-SY-010, TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES</p> <p>Drawing DD-TC-004, STATION INTERLOCKING LAYOUT-TYPICAL</p> <p>Drawing DD-TC-005, UNIVERSAL INTERLOCKING LAYOUT-TYPICAL</p>



ID	Interface	Document Reference(s)
		Drawing DD-TN-113, TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS Drawing DD-TN-300, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, SINGLE TRACK TWIN TBM BORED TUNNEL Drawing DD-TN-301, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL Drawing DD-TN-302, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT, TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL Drawing DD-TN-303, BASIC TUNNEL CONFIGURATION, PRELIMINARY FIXED EQUIPMENT LAYOUT - TWIN TRACK SINGLE BORED (TBM/ CIRCULAR) TUNNEL, WITHOUT SEPARATION WALL
	3.4.2.4 Air Gaps	
IF 657	3.4.2.4.1 Interface between SYS COM Air Gap Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM air gap requirements have been addressed by the INF team.	DCM, 28.4.1.5, General Communications Systems End-Devices DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
	3.4.2.5 Dead & Live Loads	
IF 3016	3.4.2.5.1 Interface between SYS COM System Dead Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM system dead load requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Wayside facilities 	DCM, 12.5.1.1, Dead Load (DC, DW) DCM, 12.5.3.1, Loads for Design of Overhead Contact System Pole Foundation DCM, 28.4.1.4, General Communications Systems Physical, Enclosure and Power DCM, 28.4.1.5, General Communications Systems End-Devices DCM, 28.5.2, Communications Interface Cabinets DCM, 28.5.6.2, Aerial Cable Conduits
	3.5 Grounding & Bonding	
	3.5.1 Interfaces with Guideway (excl. Trackwork)	
	3.5.1.1 Systemwide	
IF 4252	3.5.1.1.1 Interface between SYS Conduit, Duct Bank, Cable Trough & Manhole Requirements	



ID	Interface	Document Reference(s)
	G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS conduit, duct bank, cable trough & manhole grounding & bonding requirements have been addressed by the INF team.	DCM, 12.14.2, Grounding and Bonding DCM, 22.10, Grounding Requirements for Raceway, Cable Tray, Underground Ductbanks, and Structures DCM, 22.11.1, General DCM, 22.11.4, Facility Power System and Lighting System DCM, 22.11.5, Cable Trough and Outside Plant DCM, 22.3, General Grounding and Bonding Requirements DCM, 22.8.1, General Requirements
	3.5.1.2 At-Grade	
IF 1141	3.5.1.2.1 Interface between SYS At-Grade G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS at-grade grounding & bonding requirements have been addressed by the INF team.	DCM, 22.5.12, Fence and Gate Grounding DCM, 7.8.1.1, Fences DCM, 7.8.1.5, Gates Drawing DD-CV-006, FENCE AND GATE DETAILS
	3.5.1.3 Aerial Structures	
IF 4071	3.5.1.3.1 Interface between SYS Aerial Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS aerial structure grounding & bonding requirements have been addressed by the INF team.	DCM, 12.14.2, Grounding and Bonding DCM, 22.5.11, Screen/Noise/Wind/Safety Barriers DCM, 22.5.3, Grounding and Bonding of Structures - General DCM, 22.5.4.1, Concrete Structures DCM, 22.5.4.2, Steel Structures Drawing DD-OC-2047, TYPICAL GROUNDING AND BONDING ARRANGEMENT, AERIAL STRUCTURE, 220 MPH SEGMENT
IF 4112	3.5.1.3.2 Interface between SYS New Overpass Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS new overpass structure grounding & bonding requirements have been addressed by the INF team.	DCM, 12.14.2, Grounding and Bonding DCM, 22.5.11, Screen/Noise/Wind/Safety Barriers DCM, 22.5.8, New Overpasses DCM, 22.6.3, Overhead Contact System Drawing DD-OC-2046, TYPICAL GROUNDING AND BONDING ARRANGEMENT, GRADE SEPARATED STRUCTURE, 220 MPH SEGMENT
	3.5.1.4 Trench Structures	



ID	Interface	Document Reference(s)
IF 4122	3.5.1.4.1 Interface between SYS Trench Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS trench structure grounding & bonding requirements have been addressed by the INF team.	DCM, 12.14.2, Grounding and Bonding DCM, 22.5.11, Screen/Noise/Wind/Safety Barriers DCM, 22.5.9, Trenches, Retaining Walls, and Retained Fill Structures Drawing DD-OC-2049, GROUNDING AND BONDING ARRANGEMENT, OPEN TRENCH, 220 MPH SEGMENT
IF 5796	3.5.1.4.2 Interface between SYS Cut & Cover Tunnel Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS cut & cover tunnel structure grounding & bonding requirements have been addressed by the INF team.	DCM, 12.14.2, Grounding and Bonding DCM, 22.5.10, Tunnels Drawing DD-OC-2048, TYPICAL GROUNDING AND BONDING ARRANGEMENT, CUT AND COVER TUNNEL, 220 MPH SEGMENT
	3.5.1.5 Utilities	
IF 3999	3.5.1.5.1 Interface between SYS Utility G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS utility grounding & bonding requirements have been addressed by the INF team.	DCM, 22.12, Grounding and Bonding Requirements for Utilities DCM, 22.3.1, General Facility Grounding DCM, 22.5.13, Third-Party Grounding Interface DCM, 22.9, Grounding and Bonding Requirements for Facility Power Systems and Lighting Systems DCM, 9.5.4.7, Casings DCM, 9.5.5.7, Overhead Utilities
	3.5.1.6 External	
IF 4107	3.5.1.6.1 Interface between SYS Existing Overpass Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS existing overpass structure grounding & bonding requirements have been addressed by the INF team.	DCM, 12.14.2, Grounding and Bonding DCM, 22.5.11, Screen/Noise/Wind/Safety Barriers DCM, 22.5.7, Existing Overpasses DCM, 22.6.3, Overhead Contact System Drawing DD-OC-2046, TYPICAL GROUNDING AND BONDING ARRANGEMENT, GRADE SEPARATED STRUCTURE, 220 MPH SEGMENT
	4 Rolling Stock	
	4.1 HST Trainsets	



ID	Interface	Document Reference(s)
	4.1.1 Interfaces with Guideway (excl. Trackwork)	
	4.1.1.1 Track Alignment	
IF 392	4.1.1.1.1 Interface between RST HST Trainset Minimum Radii Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset minimum radii requirements have been addressed by the INF team.	DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.4.3, Effects of Radius Curvature DCM, 3.5.1, Effect of Small Radii DCM, 3.7.2, Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 4.14, Access Tracks to Yards and Maintenance Facilities DCM, 4.4.3, Minimum Radii RST Specs, 2.10, Major Dimensions/Attributes
IF 489	4.1.1.1.2 Interface between RST HST Trainset Actual Superelevation Requirements (incl. Tilting) and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset actual superelevation requirements have been addressed by the INF team.	DCM, 3.3.1, Vertical Clearances DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.4.4, Effects of Superelevation DCM, 3.5.2, Effect of Superelevation on Track Centers DCM, 3.7.2, Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 4.4.5.2, Actual Superelevation RST Specs, 2.3, Design of Trains (5-01.2) RST Specs, 22.1, Static Gauge and Dynamic Envelopes RST Specs, 22.3, Dynamic Envelope (SR5-03.1)
IF 395	4.1.1.1.3 Interface between RST HST Trainset Unbalanced Superelevation Requirements	



ID	Interface	Document Reference(s)
	and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset unbalanced superelevation requirements have been addressed by the INF team.	DCM, 4.4.5.3, Unbalanced Superelevation RST Specs, 7.10.1, General
IF 70	4.1.1.1.4 Interface between RST HST Trainset Maximum Grade Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset maximum grade requirements have been addressed by the INF team.	DCM, 4.5.1, Maximum Grades RST Specs, 10.6, Maximum Gradients (SR 5-03.6)
	4.1.1.2 Vehicle Static Gauge & Dynamic Envelope	
IF 490	4.1.1.2.1 Interface between RST HST Trainset Static Gauge Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset static gauge requirements have been addressed by the INF team.	DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.1, Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM, 3.7.2, Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation RST Specs, 2.10, Major Dimensions/Attributes RST Specs, 2.3, Design of Trains (5-01.2) RST Specs, 22.1, Static Gauge and Dynamic Envelopes RST Specs, 22.2, Static Gauge (SR5-03.1)
IF 481	4.1.1.2.2 Interface between RST HST Trainset Dynamic Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset dynamic envelope requirements have been addressed by the INF team.	DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.7.1, Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM, 3.7.2, Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation RST Specs, 2.3, Design of Trains (5-01.2) RST Specs, 22.1, Static Gauge and Dynamic Envelopes RST Specs, 22.3, Dynamic Envelope (SR5-03.1)



ID	Interface	Document Reference(s)
	4.1.1.3 Aerodynamic Effects	
IF 604	4.1.1.3.1 Interface between RST HST Trainset Aerodynamic Effects and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset aerodynamic effects have been addressed by the INF team.	DCM, 12.5.2.7, Slipstream Effects (SS) DCM, 12.7.1.7, Slipstream Effects from Passing Trains DCM, 12.8.6.15, Walkways, Parapets, and Sound Walls DCM, 12.8.8, Emergency Access DCM, 13.1, Scope DCM, 13.16.2, Noise Mitigation Hood DCM, 13.2, Regulations, Codes, Standards, and Guidelines DCM, 13.3.11, Rolling Stock DCM, 13.3.12, Aerodynamic Considerations DCM, 13.4, Tunnel Portals DCM, 13.4.1, Sonic Booms at Tunnel Portals DCM, 13.8.6, Aerodynamic forces DCM, 3.4, Vehicle Clearance Envelopes DCM, 3.5, Track Center Spacing DCM, 3.7.3, Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM, 3.7.4, Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM, 7.8.1.2, Walls RST Specs, 5.16, Carbody Aerodynamic Provisions RST Specs, 5.16.1, Aerodynamic Loads on Track Workers at the Line Side (5-06.3) RST Specs, 5.16.3, Pressure Loads in Open Air (5-06.5) RST Specs, 5.18, Tables
	4.1.1.4 Loads & Forces	
IF 1073	4.1.1.4.1 Interface between RST HST Trainset Axle Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset axle loads have been addressed by the INF team.	DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 12.6.6.1, High Speed Train Loading (LLV) DCM, 13.9.5, Fatigue Analysis DCM, 9.5.4.5, Placement RST Specs, 2.5, Static Axle Load (5-03.2)



ID	Interface	Document Reference(s)
IF 3457	4.1.1.4.2 Interface between RST HST Trainset Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset dynamic train-structure interaction has been addressed by the INF team.	DCM, 12.6, Track-Structure Interaction DCM, 12.6.6, Dynamic Analysis using Actual High-Speed Trains DCM, 12.6.6.1, High Speed Train Loading (LLV) DCM, 12.6.7.1, Dynamic Train-Structure Interaction Analysis DCM, 13.9.3, Dynamic Analysis TM 6.1, 3.1.1, ANALYSIS
IF 3180	4.1.1.4.3 Interface between RST HST Trainset Traction & Braking Forces and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset traction and braking forces have been addressed by the INF team.	DCM, 12.5.2.4, Traction and Braking Forces (LF) DCM, 12.5.2.4, Traction and Braking Forces (LF) DCM, 13.9.3, Dynamic Analysis RST Specs, 10.34, Tables RST Specs, 10.4, Mean Acceleration (SR 5-08.1) RST Specs, 11.29, Tables RST Specs, 11.6, Minimum Braking Performance (5-04.1) RST Specs, 11.7, Service Braking Performance (5-04.4)
IF 3185	4.1.1.4.4 Interface between RST HST Trainset Nosing & Hunting Effects and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset nosing and hunting effects have been addressed by the INF team.	DCM, 12.5.2.5, Nosing and Hunting Effects (NE) RST Specs, 7.10.10, Design for Vehicle Stability
IF 3227	4.1.1.4.5 Interface between RST HST Trainset Derailment/Collision Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset derailment/collision loads have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • HST structures • Trench structures • Other than station & platform structures • Beyond end of track structures 	DCM, 12.5.2.13, Derailment Loads (DR) DCM, 12.5.2.14, Collision Loads (CL) DCM, 13.9, Structural Analysis RST Specs, 2.5, Static Axle Load (5-03.2)



ID	Interface	Document Reference(s)
	5 Guideway (excl. Trackwork)	
	5.1 Drainage	
	5.1.1 Interfaces with Operations & Maintenance	
	5.1.1.1 Maintenance	
IF 1260	5.1.1.1.1 Interface between O&M Mol Pump Station Site Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M Mol pump station site access requirements have been addressed by the INF team.	DCM, 12.10.7, Trench Drainage DCM, 13.15.6, Fencing DCM, 13.16.21, Parking for Tunnel Maintenance and Traction Power Facility DCM, 13.16.4.2, Fixed Facility Power DCM, 13.16.5, Access Road DCM, 7.7.1.1, Access Roads DCM, 7.7.5.1, Parking Facilities for Wayside Facilities DCM, 7.8.1.5, Gates DCM, 8.6.4, Tunnels DCM, 8.6.6, Trenches Drawing DD-CV-006, FENCE AND GATE DETAILS Drawing DD-CV-007, FENCE AND GATES LOCATIONS Drawing DD-TN-400, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-401, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Drawing DD-TN-403, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN Drawing DD-TN-404, TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, FRONT ELEVATION Drawing DD-TN-406, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, PLAN Drawing DD-TN-407, TUNNEL PORTAL FACILITIES, BELOW GRADE TWIN TUNNEL CONFIGURATION, ELEVATION Maintenance of Infrastructure, 2, CHST Infrastructure System And Maintainability Maintenance of Infrastructure, 2.5, Structures Maintenance of Infrastructure, 9.4, Right of Way Access
	6 External	



ID	Interface	Document Reference(s)
	6.1 Amtrak	
	6.1.1 Interfaces with Guideway (excl. Trackwork)	
	6.1.1.1 Vehicle Static Gauge & Dynamic Envelope	
IF 3764	6.1.1.1.1 Interface between EXT Amtrak Trainset Dynamic Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset dynamic envelope requirements have been addressed by the INF team.	DCM, 3.1, Scope DCM, 3.4, Vehicle Clearance Envelopes
	6.1.1.2 Loads & Forces	
IF 3706	6.1.1.2.1 Interface between EXT Amtrak Trainset Axle Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset axle loads have been addressed by the INF team.	DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM, 12.5.2.1.5, Amtrak Live Loads DCM, 9.5.4.5, Placement
IF 3683	6.1.1.2.2 Interface between EXT Amtrak Trainset Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset dynamic train-structure interaction has been addressed by the INF team.	DCM, 12.6, Track-Structure Interaction DCM, 12.6.8, Modeling Requirements
IF 3537	6.1.1.2.3 Interface between EXT Amtrak Trainset Derailment/Collision Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset derailment/collision loads have been addressed by the INF team, including but not limited to: • HST structures • Trench structures	DCM, 12.5.2.13, Derailment Loads (DR) DCM, 12.5.2.13.2, Track Side Containment DCM, 12.5.2.14, Collision Loads (CL)
IF 3701	6.1.1.2.4 Interface between EXT Construction Equipment Axle Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT construction equipment axle loads	DCM, 12.4.1, Structural Design Parameters DCM, 12.5.2.1, Live Loads (LLP, LLV, LLRR, LLH, LLS)



ID	Interface	Document Reference(s)
	have been addressed by the INF team.	DCM, 12.5.2.1.4, Maintenance and Construction Train Live Loads: Cooper E-50 Loading (LLRR) DCM, 12.5.3.3, Construction Loads and Temporary Structures DCM, 12.8.5.3, Crack Control
IF 3673	6.1.1.2.5 Interface between EXT Construction Equipment Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT construction equipment dynamic train-structure interaction has been addressed by the INF team.	DCM, 12.6, Track-Structure Interaction DCM, 12.6.8, Modeling Requirements

Interoperability Items Abbreviation Legend

Abbreviation	Definition	Abbreviation	Definition
ATC	Automatic Train Control	Mol	Maintenance of Infrastructure
BoD	Basis of Design	MTC	Maintenance
COM	Communications	O&M	Operations & Maintenance
ConOps	Concept of Operations	OCS	Overhead Contact System
DCM	Design Criteria Manual	PHA	Preliminary Hazard Analysis
EXT	External	RST	Rolling Stock
G&B	Grounding & Bonding	SAF	Safety
GEN	General	SYS	Systems
GWY	Guideway	TCC	Train Control & Communications
HST	High Speed Train	TP	Traction Power
INF	Infrastructure		

